Project HG06015:

Improving Urban Irrigation Practice in Sydney

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Project HG06015:

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Project Purpose:

The ultimate purpose of the project is to assist people managing domestic and open space urban irrigation systems to operate the systems efficiently, to make water savings and to more closely monitor irrigation water use. The project sought to work with the irrigation industry, local councils and water authority staff to ensure that public education on irrigation was delivered using industry experts to promote best practice irrigation.

Funding Sources

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Summary

The ultimate intent of the project was that the community, including domestic gardeners, open space managers and policy makers would have a better appreciation of best practice irrigation, so that they would continue to have confidence in gardening and urban landscapes throughout the drought. To achieve this, the project aimed to assist people managing domestic and open space urban irrigation systems in Sydney to operate the systems efficiently, to make water savings and to more closely monitor irrigation water use. The project targeted the three essential markets for improving water conservation in urban irrigation, namely:

- the public to understand best practice garden watering behaviour;
- local government as large water users for open space and green space; and
- industry to provide professional levels of advice and service for best practice irrigation to both the public and to local government.

The project involved, amongst other things:

- public seminars on good garden watering practice, presented by irrigation industry experts at nurseries and garden clubs across the Sydney metropolitan area;
- running Irrigation Audit/Efficiency courses for open space managers across Sydney, targeting local government participants;
- establishing a Certified Irrigation Professionals scheme to recognise industry competency and expertise; and
- working with state government agencies and water authorities seeking for this certification framework to be embedded in a more sophisticated outdoor urban water conservation policy framework.

This project was the first time a coordinated and whole of market approach has been taken to urban irrigation water conservation and:

- enabled 23 public seminars with over 890 participants, with seminar evaluation revealing that over 55% would change the way their garden watering system operates as a result of the seminar;
- supported 6 Irrigation Efficiency courses being held with 81 participants from local government, open space managers, policy makers and water and irrigation consultancies with post course evaluation showing that most participants had an improved awareness of the requirements for more efficient irrigation;
- assisted in the substantial work required to establish a Certified Irrigation Professionals scheme, with 86 people now holding Certifications in NSW – and growing; and
- helped IAL to work with governments to examine alternative approaches to water restrictions, to benefit the urban community lifestyles and the horticultural sector.

1. Introduction

The NSW Government introduced water restrictions on outdoor water use from October 2003. While water restrictions reduce water consumption (from over 600GL/annum in Sydney prior to restrictions to approximately 530GL/annum after restrictions), the restrictions:

- generally came at significant community cost, with costs estimated at $150 per household in Sydney[1]; and
- do not secure sustainable savings as they do not educate the community how to increase outdoor water use efficiency.

In the context of drought and water restrictions in Sydney, the ultimate intent of the project was to enable the community, including domestic gardeners, open space managers and policy makers, to continue to have confidence in gardening and urban landscape investment through a better appreciation of best practice irrigation, water savings and more closely monitoring their irrigation water use. The project targeted the three essential markets for improving water conservation in urban irrigation, namely:

- the public to understand best practice garden watering behaviour;
- local government as large water users for open space and green space; and
- industry to provide professional levels of advice and service for best practice irrigation to both the public and to local government.

The project was significant for the irrigation and horticultural industries as it:

- brought a whole of market approach to outdoor urban water conservation from irrigation practice, by linking professional irrigation expertise with nurseries, local government open space managers and the general public;
- provided the technical capacity for project participants to make water savings whilst simultaneously preserving the value of urban green space in Sydney;
- maintained the confidence of the community to continue investing in horticulture, rather than to just turn the tap off; and
- importantly, assisted urban water policy makers to better understand the complexity of best practice irrigation, the science behind best practice and the need for professional irrigation services to be available to the community which will provide the platform for better, more sophisticated water conservation policy frameworks in future.

[1] Productivity Commission, 2008. Productivity Commission Research Paper: Towards Urban Water Reform: A Discussion Paper.

2. Method and Activities

2.1 Background

The Irrigation Association of Australia (IAA) had previously developed a number of innovative programs aimed at identifying and implementing urban irrigation best practice and auditing irrigation performance. These programs included the Certified Irrigation Auditor program, the Waterwise Garden Irrigator Scheme and the Smart Approved WaterMark. The project aimed to promote and roll out these programs throughout the greater Sydney metropolitan area, although the precise nature of these programs and the nomenclature for the programs changed for the implementation in the Sydney context. The project also worked closely with the NSW government.

The project essentially had four audiences, namely:

- the general public;
- local government and other large open space water users;
- the irrigation industry; and
- state government.

Different strategies were developed for each of these audiences. For the purposes of clarity throughout this report:

- the program for the general public became known as the *Home Garden Water Savings Seminars*;
- the program for local government and open space managers was initially termed the *Certified Irrigation Auditor* program, but changed during the term of the project to the *Irrigation Efficiency Course* program; and
- the *Waterwise Garden Irrigator* (WGI) scheme did not eventuate in Sydney because it did not get support from Sydney Water, but IAL instead worked with Sydney Water to develop a water restrictions exemption framework that, like the WGI scheme, involved trained irrigation professionals providing domestic irrigation services. For the purposes of this report, this has been termed the *Irrigation System Check* scheme.

Project management arrangements and the details of the strategies for these audiences are explained below.

2.2 Project Management

The project was managed by IAA initially and then by IAL following its formation in September 2007.

The IAA initially employed a Project Officer in 2006 to establish and manage all aspects of this project. One project officer was employed from the commencement of the project, but then departed in February 2007. Another project officer was then appointed, but also left IAL later in 2007. IAL then decided to manage each strategy separately, under the guidance and management of IAL's CEO.

The *Irrigation Efficiency* courses were run through IAL's Training Development Manager and national administration, the *Home Garden Water Savings Seminars* was contracted out to Ms Helen Moody because of her experience and contacts in the horticultural media sector, and the *Irrigation System Check* process was largely run from the IAL's national office in conjunction with its Sydney Region committee. This arrangement proved to be a

successful means of minimising the risks to the overall project of having just one project officer involvement in its implementation.

2.3 Strategies and Activities

2.3.1 Home Garden Water Savings Seminars

The IAA worked with NGIA (NSW) to develop and implement the *Home Garden Water Savings Seminars* across Sydney. The strategy involved:

- piloting of a public information session on good garden watering principles at NGIA accredited nursery outlets, where the seminars were based around IAL's *Your Guide to Good Garden Watering*;
- refining the presentation and the type of information presented at these seminars based on feedback from participants;
- rolling out the program across Sydney by inviting IAL members to do the presentation at willing nursery outlets, thereby linking irrigation expertise, nursery outlets and the public. A good geographic spread of nursery outlets across the Sydney metropolitan area was sought;
- marketing and promotion of the program;
- distribution of the IAL's *Your Guide to Good Garden Watering* through participating nursery outlets subsequent to public seminars; and
- requesting public participants to fill in and mail log books of water use to IAL, to enable IAL to quantify water savings resulting from changed irrigation practices.

The program was progressively refined throughout the term of the project with the following alterations:

- the project was extended from nurseries to garden clubs to increase public participation in 2007;
- the IAL's *Your Guide to Good Garden Watering* being revised in 2008 to better reflect and respond to the types of enquiries being raised by the public seminars; and importantly
- the water use participant log books for recording actual water savings from this program had to be discarded due to the low number of respondents. This log book was replaced with a survey at nursery presentations (but not at garden clubs because of the format of these presentations), where the participants at the seminars were asked to evaluate the seminar and provide feedback about whether they would change practice as a consequence of the seminar. Consequently, no data can be provided on actual water savings from this program as intimated in the project proposal, although quantitative information on likely behaviour change is provided instead.

IAL's *Your Guide to Good Garden Watering* (2008 2nd edition) is at Attachment A, and the participant survey template used in lieu of the water use log book is at Attachment B. A list of the public seminars undertaken, and the participant numbers at each event is at Attachment C.

2.3.2 Irrigation Efficiency Program

IAL runs Irrigation Efficiency courses which teaches open space managers how to evaluate the efficiency of their irrigation systems, how to adjust irrigation schedules if necessary to ensure only the right amount of water is used, how to conduct basic maintenance on equipment and know when to get professional irrigation assistance for open space irrigation systems and management. The course is primarily aimed at local government open space managers, but also attracts many other open space managers

and policy makers to assist them to understand the science behind irrigation scheduling, best practice irrigation and system auditing.

The course involves:

- formal two days training involving:
    - theoretical sessions on best practice open space irrigation and auditing techniques;
    - field sessions on auditing of open space irrigation systems; and
- participants undertaking audits of their own irrigation systems following the formal two days, with the audit being assessed by an industry expert.

A Certificate of Attainment is issued by IAL to participants who attend the training and then subsequently do a competent audit of their own system. The Certificate of Attainment contributes to the following three (3) units of competency from the Certificate III in Irrigation:

- RTE3605A – Troubleshoot irrigation systems
- RTE3607A – Measure irrigation delivery system performance
- RTE3611A – Operate pressurised irrigation systems

IAL undertook significant promotion of these courses, regularly writing to all Sydney Metropolitan Councils about the availability of the course, following up and meeting with individual Councils, presenting at the Parks and Leisure Conference at Sydney Olympic Park in August 2006, and changing the course name from Certified Irrigation Auditor – Landscape to Irrigation Efficiency course based partially on feedback from local government participants that the term “audit” may have implications for councils in respect to player safety duty of care responsibilities.

A list of dates, locations, trainers and participants at the Certified Irrigation Efficiency courses run within this project is at Attachment D.

2.3.3 Irrigation System Check

IAA’s project proposal indicated that it would develop, promote and run a *Waterwise Garden Irrigator* (WGI) program in Sydney, with support for participants through Sydney Water. The WGI program envisaged at the time of the proposal was similar to the WGI program operating in WA, where government rebates are available for domestic irrigation systems installed to specified standards by a WA Water Corporation accredited irrigation system installer, and where the installer accreditation is obtained by meeting WA Water Corporation requirements.

IAA unsuccessfully attempted to persuade the NSW Government and Sydney Water to run a WGI program in Sydney. These circumstances were beyond the control of IAL. Consequently, the project methodology departed from the initial project proposal, and needed to evolve as opportunities became available to work with Sydney Water and the NSW Government on alternative urban water conservation frameworks.

Instead of the original project methodology IAA and IAL have progressively worked with the NSW Government and Sydney Water to improve its understanding of the science behind best practice irrigation, and to promote alternative, science based alternatives to the water restrictions in Sydney that utilise professional irrigation expertise. This was done through:

- encouraging NSW Government and Sydney Water participation at Irrigation Efficiency courses, so that relevant staff could better understand the science behind best practice irrigation and see first hand the potential benefits and water savings from irrigation audit processes;

- assisting Sydney Water with developing its Love Your Garden and Irrigation System Check pilot programs, which could provide the foundation for an alternative urban water conservation framework;
- raising with the NSW Government opportunities for outdoor urban water conservation policy refinement, to drive best practice urban irrigation across Sydney and NSW.

The letter at Attachment E provides evidence of IAL's work in this area, and NSW Government's acceptance of the need to examine alternatives to water restrictions to drive water efficiency whilst enabling the community to continue enjoying the benefits of horticulture. Sydney Water's email at Attachment F demonstrates Government's ultimate willingness to permit IAL to develop an industry run water restrictions exemption framework, which would have been akin the to the intent of the WGI proposal.

2.3.4 Certified Irrigation Professionals Program

IAA established a Certified Irrigation Professionals framework in 2006 covering six vocations, namely Irrigation Designers, Irrigation Agronomists, Irrigation Managers, Irrigation Installers, Irrigation Operators, Irrigation Contractors and Irrigation Retailers. The Certification scheme has been in place since 2006, and now has 425 Certified Irrigation Professionals in these occupations across Australia, with 86 of these Certifications in NSW.

The IAL's Certification program is a voluntary, national scheme that identifies and recognises individuals with the minimum skills and knowledge to work in these occupations so as to perform an irrigation job to the satisfaction of water managers and customers. The Certification program also requires continuous professional development for renewal of Certifications to ensure that Certified Irrigation Professionals maintain contemporary irrigation expertise and knowledge.

The activities involved in establishing the Certified Irrigation Professionals Program in Sydney and NSW have been threefold:

- promoting the Certification program to Registered Training Organisations (RTOs) such as TAFEs and entering into Memorandums of Understanding with RTOs so that they could offer relevant training courses and Recognition of Prior Learning services to support participants seeking to enter the Certification program;
- promoting the opportunities and benefits of the Certification framework to the irrigation industry, through distribution of flyers on each Certification, presenting the Certification program at all opportunities with industry eg trade days, Sydney Region IAL meetings etc, through IAL's Journal and Backwash Newsletter, and by listing Certified Irrigation Professionals on our website;
- promoting the benefits of Certification program to policy makers, to seek recognition and inclusion of the Certification program in regulatory frameworks and funding opportunities, to provide the incentive for the irrigation industry to embrace the benefits of the Certification program.

IAL had negotiated recognition of the Certification program in the Irrigation System Check program – see Sydney Water's Email at Attachment F and IAL's response at Attachment G.

IAL is also in the process of negotiating recognition of the Certification program in the NSW Government's $20million Water Smart Farms project in Western Sydney to improve peri-urban irrigation practice. The activities involved in establishing the Certification framework in Sydney as part of this project have assisted to position and enable IAL and its members to be involved in this subsequent project. DPI's response to IAL is at Attachment H.

3. Evaluation

3.1 Home Garden Water Savings Seminars

The project proposal envisaged 5 public seminars being undertaken each year of the project. The project well exceeded this, undertaking 23 public seminars with over 890 participants at 9 different nursery retail outlets and at 7 different garden clubs.

The project was seeking to achieve 2.5kL/annum water savings at each participating household through improved garden water practice. However, as indicated in Section 2, IAL had prepared a readily useable domestic garden watering log book to record water savings made by seminar participants. The log books were distributed to seminar attendees during 2006 to 2008, who were requested to record garden water use for 10 garden watering events including before and after practices were modified based on information provided to them at the seminar. The log books then needed to be mailed back to IAL to record actual water savings resulting from these seminars. Unfortunately there was a very low response rate, such that no useful water savings data could be obtained from log books.

IAL introduced a survey for seminar participants from late 2008, instead of the log book. The survey was filled out by seminar participants immediately at the conclusion of the seminar, and so got a far higher response rate. While this approach could not measure any actual water savings from the project as had been originally proposed, the survey did enable some quantitative information about likely behavioural change resulting from the information at the seminars to be measured.

The survey elicited a total of 115 respondents, which is 13% of the total number of participants at all 23 seminars over the 3 year project period. The responses can therefore be considered as reasonably representative of the total 891 seminar participants.

A summary of the survey findings is at Attachment I. Important findings were:

- 88% of respondents thought the seminars were excellent or very good, 12% thought they were fair, and no respondent thought the seminar was poor, indicating that the seminars were engaging and useful to the audiences;
- 80% currently hand water gardens, which is not surprising given that water restrictions have been in place since 2003;
- 18% have drip irrigation systems, which is relatively low given that drip is the only form of irrigation system that has been permitted under Sydney's water restrictions;
- 51% of respondents will now consider installing drip irrigation systems, 56% will consider installing a rainwater tank, and 38% will consider installing a greywater system as a consequence of the seminars, which all indicates a willingness of the community to:
    - actively contribute to water conservation; and
    - invest in systems that provide greater certainty of water supply to sustain their gardens and maintain confidence to continue interest in gardens and horticulture;
- Interestingly, 38% indicated they would not consider using a greywater system possibly demonstrating a reluctance to use lower quality water;
- 58% will consider changing the way their irrigation system operates as a consequence of the seminars.

Clearly, while no quantitative water savings can be reported, the seminars have been successful at attracting a substantial number of participants, with much water saving behavioural change likely to occur as a consequence of the seminars.

The seminars have also contributed substantially to the betterment of the horticultural and irrigation industries through:

- bringing together professional irrigation specialists with nursery outlets;
- providing opportunity for IAL members to promote professional irrigation services to local communities;
- attracting potential customers to participating nursery outlets; and
- improving confidence of public that gardening, and investment in horticultural product, is worthwhile with improved irrigation practice to ensure less and sustainable outdoor water use.

The primary learning from the Home Garden Water Saving Program was that the community is ready and willing to change outdoor water use behaviour, evidenced from the number of participants and the questionnaire responses. The community is interested in contributing to water conservation when provided with practical and affordable information about how to water gardens effectively and what systems are available to assist in enabling efficient garden watering. Notwithstanding this, a fair deal of rain fell in Sydney in late 2008 and early 2009, and this resulted in substantial difficulties in attracting participants to seminars, revealing that the community's interest in improved practice is quite fickle and strongly tied to drought conditions.

3.2 Irrigation Efficiency Program

The project proposal envisaged at least 60 local government staff being trained in irrigation auditing. IAL ran 7 (seven) Irrigation Efficiency courses in Sydney as part of this project, which included a total of 81 participants, with 32 of the participants being from 18 different local governments from across NSW. The remainder of the participants were open space managers from other organisations such as Western Plains Zoo, irrigation and water management consultancies, and policy makers from the NSW Government agencies. A list of locations, dates and participants of each course is at Attachment D.

The participation rate by local government was less than anticipated, with less than the 60 individual local government staff participating and only 15 of 45 (33%) local governments in the Sydney metropolitan region sending staff to the training.

With the exception of the May 2009 Irrigation Efficiency course, the audit documentation from course participants has been returned to the participants and so is not available for data analysis in this report. However, copies of the individual audit reports from the May 2009 course can be provided to HAL on request, and a summary of the irrigation efficiency audit findings from participants at the May 2009 Irrigation Efficiency course are summarised at Attachment J.

From the 6 audits undertaken by participants after the May 2009 Irrigation Efficiency course, the average distribution uniformity (DU) of water application at the irrigated sites was 57%, with DU ranging from 43% to 71%. All these results are below the best practice benchmark of lowest quarter DU of 75% specified in IAA, WSAA Urban *Irrigation: Best Management Practices* (2006) document. Based on the audit data from the May 2009 course, there is an average 24% water savings that can be made at the audited sites through increasing DU to 75%.

Significant water savings are clearly possible at open spaces across Sydney through auditing to identify inefficiencies in the irrigation systems, through remedial investments in irrigation systems, and through scientifically based scheduling of irrigation events that takes into account the water needs and physical nature of the turf/vegetation, the soil type and the local climate conditions.

To highlight this conclusion, and put some context to the magnitude of potential water savings at an individual open space site in Sydney, an actual case study of an irrigation efficiency audit is presented at Attachment K. The audit was for Warrina Street Oval in the Hornsby Local Government area, and was undertaken as part of the Irrigation Efficiency course run in July 2006. The DU at this site was found from the audit process to be 66%. The water savings that can be achieved from increasing the DU to 80% at this site are estimated at 187.2 KL at Warrina Street Oval for the month of December only. Assuming a conservative irrigation season of say 3 months per annum, then the total water savings from improving DU at Warrina Street oval would be about 550kL/year for this one oval. Extrapolated to all open space in the Hornsby Local Government area, there is likely to be substantially more water savings to be made than the 10,000kL/year in each Council area across Sydney that was suggested in the original project proposal.

The IAL's Irrigation Efficiency course clearly provides open space managers with the tools to make substantial water savings. The policy frameworks to drive open space managers to use tools such as the IAL's Irrigation Efficiency course are therefore clearly important to significant, cumulative water savings from widespread irrigation behavioural change of open space managers in Sydney.

3.3 Irrigation System Check and Certified Irrigation Professionals

While the NSW Government and Sydney Water did not permit a WGI style program to be implemented, IAA and IAL continued to work with Sydney Water to help it:

- develop a *Love Your Garden* program in 2006 which provides domestic home gardeners on-site advice about water efficient gardening and an irrigation schedule specific to the horticultural, soil and climate conditions of each participating household. IAA and IAL provided support to Sydney Water by attending and providing feedback on pilot site assessments for this program; and
- develop an *Irrigation System Check* pilot, which involves assessing domestic irrigation equipment to provide a rating for the irrigation system. Importantly, *Irrigation System Check* is owned by Sydney Water, and IAL assisted through its members participation on an industry advisory committee for the development of *Irrigation System Check* process.

Sydney Water invited IAL in 2009 to operate a framework that combined *Love Your Garden* and *Irrigation System Check* programs to enable exemptions from water restrictions. This alternative framework for enabling domestic irrigation and horticultural access to water is better than the initially envisaged WGI as it:

- combines the two essential components of best practice irrigation, namely operator knowledge and a well design, installed and maintained irrigation system. The operator knowledge is provided in the irrigation schedule determined from *Love Your Garden*, while the efficiency of the equipment is assessed by the *Irrigation System Check*.;
- would train, utilise and recognise appropriately qualified irrigation expertise to support the framework – as envisaged in the initial project proposal.

IAL's proposal in June 2009 for running this Irrigation System Check exemption scheme is at Attachment G. It should be noted that approximately 25 people approached IAL and its Sydney Region Chair following the release of IAL's proposal to its membership, seeking

information on how to obtain RPL for their existing skills, so that they could meet pre-requisites to participate in the proposed scheme. Clearly, the importance of an exemption framework such as the Irrigation System Check proposal is not just related to enabling community confidence in investment in horticultural and irrigation product, but also in enabling and encouraging a well trained and competent irrigation sector that is able to provide best practice irrigation and water conservation advice to the community.

The NSW Government subsequently lifted water restrictions in late June 2009. While IAL cautiously welcomed this decision as it enables the horticultural and irrigation industries to operate more freely for the first time since restrictions were introduced in 2003, IAL is still seeking to run the Irrigation System Check approach to demonstrate to Government that there is a viable alternative to water restrictions in the future. A letter from Sydney Water at Attachment L confirms the prospects of running a small Irrigation System Check pilot in 2010/11. A viable and tested exemptions framework will be a real legacy from this project, enabling Government an alternative to future water restrictions that will assist in ensuring the sustainability of the horticultural and irrigation industries during future droughts.

There are now 86 people in NSW holding IAL Certifications including 13 Certified Irrigation Installers and 2 Certified Irrigation Contractors, with significant additional numbers expected when the Irrigation System Check pilot commences in 2010/11 and should NSW DPI adopt the certification framework in its Water Smart Farms project.

4. Implications

4.1 Overall Project Implications

The project was significant for the irrigation and horticultural industries as it:

- brought a whole of market approach to outdoor urban water conservation from irrigation practice, by linking professional irrigation expertise with nurseries, local government open space managers and the general public;
- provided the opportunity for capacity building of project participants, both domestic participants and professional open space managers, to make water savings whilst simultaneously preserving the value of urban green space in Sydney;
- provided the opportunity for the community to learn about efficient irrigation practice and thereby maintain confidence to continue investing in horticulture, rather than to just turn the tap off; and
- importantly, assisted urban water policy makers to better understand the complexity of best practice irrigation, the science behind best practice and the need for professional irrigation services to be available to the community which will provide the platform for better, more sophisticated water conservation policy frameworks in future.

Despite these significant successes, an important implication of this project for the horticultural and irrigation industries is to recognise that urban irrigation is a complex area for policy makers and the general community alike. While there is clearly significant water savings to be made through improved irrigation practice in domestic and open space settings, the path to behavioural change is relatively slow. There are many and varied reasons why change in urban irrigation practice is slow, including:

- that the need for improved irrigation practice in Sydney has been competing with a water restrictions framework, where the message is essentially to turn the tap off;

- programs for improved irrigation practice are competing with other water savings initiatives for both government funds, policy development work and for community attention eg rebates for washing machines and rainwater tanks, large scale investments in desalination, water pricing etc;
- best practice irrigation is a complex science, which can be difficult for policy makers and the community to grasp, particularly given that water savings are difficult to quantify because of:
    - the many factors that affect irrigation water use eg vegetation type, soil type, site specific factors such as wind, shading etc, and operator knowledge levels;
    - lack of metering specific to the irrigation area only in both domestic and many open space settings; and
- the horticultural and irrigation industries need to earn the credibility and trust of both policy makers and the community before they will listen to information about the science behind good irrigation practice and the opportunities for water savings.

Consequently, the horticultural and irrigation industries need to perceive behavioural change to improved irrigation practice as an evolutionary process, not as a revolution to be accomplished with one project.

Nonetheless, this project has laid the ground work for this change in Sydney with:

- government as evidenced by both:
    - the Irrigation System Check process and the willingness to recognise the IAL's Certified Irrigation Professionals program within this program; and
    - the interest of NSW DPI to utilise Certified Irrigation professional skills to underpin its Water Smart Farms funding program;
- the community as shown through the level of participation in the Home Garden Water Savings Seminar program and the willingness of participants to consider changes to their irrigation systems as result; and
- the irrigation industry itself and the interest it has shown in seeking out training and certification to participate in initiatives such as the Irrigation System Check program.

The horticultural and irrigation industries now need to continue on this project's ground work to ensure the policy frameworks drive improved irrigation efficiency, that the community continues to have access to practical information about how to undertake best practice irrigation and that there is a recognised irrigation and horticultural industry that can support and provide best practice irrigation expertise to the community. Specific recommendations are included in the following sections.

4.2 Implications for Domestic Irrigation Public Education Programs

4.2.1 Continuation of Home Garden Water Savings seminars

The information from the *Home Garden Water Saving Seminar* program needs to continue being promoted whilst the water conservation ethos remains prevalent in the community. Given that there have been relationships already established through this project with nursery outlets and garden clubs, and that there is potential commercial benefit for both the nursery outlets and for irrigation experts delivering the seminars, there remains potential to continue the existing *Home Garden Water Saving Seminar* program on an as needs basis without further funding assistance. IAL could help facilitate this process.

Recommendation 1
The Home Garden Water Savings Seminars program continue in its current form where IAL acts as a facilitator by extending an open written invitation to NGIA (NSW), nursery outlets and garden clubs to run seminars on request by connecting irrigation industry experts directly with those nursery outlets and clubs.

4.2.2 Planning Future Public Communications Programs

This program attracted significant participation during dry weather conditions. However, once there was rain in late 2008 and early 2009 some planned seminar sessions had to be cancelled due to lack of participation, indicating that community attention to water conservation is fickle. The planning of future seminar programs therefore needs to avoid winter when outdoor water use is relatively low in Sydney anyway, avoid high rainfall seasons and be flexible around short and medium term weather conditions.

Recommendation 2
Planning of garden water savings seminars needs to be flexible and cognisant of seasons, and short and medium weather condition forecasts.

The project budget for the public seminars was $90,000 over 3 years, used primarily in developing seminar materials, redrafting and publishing the IAL's *Your Guide to Good Garden Watering*, marketing and promotion of the seminar program, and management and administration of the program. This equates to $101 per participant, or $174 per participant that will consider changes to their irrigation system as a result of the *Home Garden Water Savings Seminars* program.

While the *Home Garden Water Savings Seminars* program was successful in its own right, attracting high participation for a public seminar style event, significant water savings from domestic gardening will require the cumulative savings from widespread behavioural change across the community. Mass media initiatives may therefore be required to achieve this rather than public seminars, and while the program may be more expensive, it may also be far more cost effective. This project has provided some well founded cost benchmarks which could be used to compare the cost effectiveness of proposed future public seminar programs against alternative public education options such as mass media programs.

Recommendation 3
Consider the cost effectiveness of alternative options when planning public information programs for domestic garden water savings in future, using the cost benchmarks from this project as a reference point.

4.3 Implications for Open Space Irrigation Programs

The May 2009 course audit findings and the Warrina Street case study confirm that open space irrigation in Sydney is generally not performing at a reasonable minimum standard (average 57% relative to best practice of 75%). The consequence of this is that playing surfaces at sports grounds are probably generally of lesser quality than what could be achieved for the quantum of water currently being used by open space managers, and that there are substantial water savings still to be made from open space irrigation across Sydney through a systematic auditing and remediation process such as that taught in the IAL's Irrigation Efficiency courses.

The courses run as part of this project are clearly a useful first step to build the capacity of open space managers to identify irrigation efficiency and irrigation system issues. However, further follow up is needed to assist course participants to normalise the irrigation system audit process and irrigation scheduling into their day-to-day management arrangements, and to assist them in their workplace to prepare business cases for investment in changed irrigation systems and practice. IAL and the horticultural industry need to develop follow up processes to these Irrigation Efficiency courses to encourage this changed practice in open space irrigation.

Recommendation 4
IAL further develop the Irrigation Efficiency course to include a follow up module to provide additional assistance to participants on their own open space sites to undertake audits, develop site specific irrigation schedules and to prepare business cases for investing in improved practice.

Recommendation 5
Future projects that include Irrigation Efficiency courses include specific funds and milestones to enable follow up to assist the normalisation of the irrigation efficiency skills learned at the course into open space management arrangements within the organisations of each participant.

There remains a large market for local government participation in Irrigation Efficiency courses, with only a third of Sydney's councils sending staff to courses run under this project. IAL needs to develop further marketing and promotion material for these courses, which is aimed specifically at local government. The drivers for local government are likely to be:

i) the community good from water savings;
ii) the financial savings from reduced water and energy bills; and
iii) staff development.

Recommendation 6
IAL develop market and promotion material that includes business case studies using real course participant audit data to identify measured water savings, financial savings, investment return periods for irrigation upgrades on open space in Sydney and participant references.

4.4 Working with Governments to Support Best Practice Irrigation

The attempts to get a WGI style program in Sydney demonstrate the amount of effort, time and ground work that is required to convince policy makers about the public benefits of good irrigation practice.

The primary learning from this component of the project is that one should not assume that governments will readily adopt progressive outdoor water conservation frameworks, as was the case in IAA's project proposal. Rather, significant project effort and resource needs to be afforded to simply educating policy makers about the public benefits of horticulture and best practice irrigation, the complexity of good irrigation practice, and in quantifying the likely water savings.

This project has clearly demonstrated that there remains scope for further water savings to be made through improved irrigation practice, especially in open space irrigation. The horticultural and irrigation industries would be well served in continuing to work with governments to develop policy to drive best practice irrigation. However, the horticultural

and irrigation industries need to approach this task in a more staged manner, and with more realistic timeframes for securing policy change. A first stage is to educate policy makers, which has largely been achieved in Sydney by this project, the second stage is to develop policy options, the third stage is to pilot the options and then to implement a preferred option and, finally, all policy should be refined over time to take into account the effectiveness of policy, changed circumstances around the policy, and new science or information that emerges to warrant policy refinement.

Given that policy development is a continuous process, the horticultural and irrigation industries need to continue to invest effort in working with government's to develop policy frameworks that secure sustainable and certain futures for the horticultural and irrigation industries. In particular, the horticultural and irrigation industries need to be seeking policy frameworks that:

i) make genuine water savings – to minimise the prospects of future water restrictions, and reduce outdoor urban water use as an easy target for restrictions;
ii) recognise and legitimise irrigation professionals to provide a clear career pathway for professional development in the industry and ensure a capable and competent professional irrigation efficiency service is available to the community - to ultimately enable it to have confidence to continue investing in horticultural product.

Recommendation 7
The horticultural and irrigation industries continue to invest effort and resource into working with government's to continuously develop, test, refine and improve policy to drive widespread improvement in efficient urban irrigation practice in Sydney.

5. Summary of Recommendations

Recommendation 1
The Home Garden Water Savings Seminars program continue in its current form where IAL acts as a facilitator by extending an open written invitation to NGIA (NSW), nursery outlets and garden clubs to run seminars on request by connecting irrigation industry experts directly with those nursery outlets and clubs.

Recommendation 2
Planning of garden water savings seminars needs to be flexible and cognisant of seasons, and short and medium weather condition forecasts.

Recommendation 3
Consider the cost effectiveness of alternative options when planning public information programs for domestic garden water savings in future, using the cost benchmarks from this project as a reference point.

Recommendation 4
IAL further develop the Certified Irrigation Efficiency course to include a follow up module to provide additional assistance to participants on their own open space sites to undertake audits, develop site specific irrigation schedules and to prepare business cases for investing in improved practice.

Recommendation 5
Future projects that include Certified Irrigation Efficiency courses include specific funds and milestones to enable follow up to assist the normalisation of the irrigation efficiency skills learned at the course into open space management arrangements within the organisations of each participant.

Recommendation 6
IAL develop market and promotion material that includes business case studies using real course participant audit data to identify measured water savings, financial savings, investment return periods for irrigation upgrades on open space in Sydney and participant references.

Recommendation 7
The horticultural and irrigation industries continue to invest effort and resource into working with government's to continuously develop, test, refine and improve policy to drive widespread improvement in efficient urban irrigation practice in Sydney.

Acknowledgements

The IAL would like to acknowledge all persons and organisations that have been involved in this project *Improving Urban Irrigation Practice in Sydney*. In particular, IAL would like to thank:

- HAL for providing funds to undertake this ground breaking project for a whole of market approach to urban irrigation in Sydney;
- Ms Helen Moody for her diligent efforts on the Home Garden Water Savings Seminar program;
- Nursery outlets, garden clubs and irrigation experts that participated and invested time and effort into the Home Garden Water Savings Seminar program;
- Participants and course instructors involved in the Irrigation Efficiency courses;
- Tony Robinson and Sydney Water for enabling IAL participation in the Irrigation System Check process and for listening and learning about the complexity of best practice irrigation; and
- IAL staff for their diligent and committed work on this project.

ATTACHMENT A

IAL's *Your Guide to Good Garden Watering*

Available as a pdf at
http://www.irrigation.org.au

ATTACHMENT B
Participant Evaluation Survey

ABN 41 002 567 633

Home Gardeners Water Savings Presentation

Evaluation sheet

Date: 1 June 2008 at 2.30pm

Venue: Altra Nursery, Peakhurst

Please help us evaluate this seminar by spending a few minutes filling in this sheet and handing it in before you leave.

Note: tick more than one box if appropriate

What garden watering method do you currently use?

❑ Hand held hose ❑ Drip irrigation ❑ Sprinkler

❑ Greywater ❑ Water tank

What 2 or 3 tips or bits of information from this seminar will you use in your garden?

1._____

2._____

3._____

As a result of this seminar would you consider installing a:

drip irrigation system	❑ Yes	❑ No	❑ Maybe
rainwater tank	❑ Yes	❑ No	❑ Maybe
greywater system	❑ Yes	❑ No	❑ Maybe

Would you consider making changes to your irrigation system as a result of this seminar?

❑ Yes ❑ No ❑ Maybe

Please give examples if possible

Please rate the seminar

❑ Poor ❑ Fair ❑ Very good

Would you like to suggest ways we can improve it?

ATTACHMENT C
List of Home Garden Water Savings Seminars

Date	Seminar No.	Location	No. Participants
Jul-Dec 2006	1	Rast Bros Nursery, Turramurra	22
	2	Rast Bros Nursery, Turramurra	28
	3	Tim's Garden Centre, Campbelltown	28
	4	Eden Gardens, North Ryde	10
	5	Tim's Garden Centre, Campbelltown	16
Jan-Jun 2007	6	Sydney West Wildflower Nursery, Marsden Park	25
	7	Friends of the Garden, Botanic Gardens, Sydney	58
	8	Eden Gardens, North Ryde	36
Jul-Dec 2007	9	Swane's Nursery, Dural	12
	10	North Rocks Greenery	45
	11	North Rocks Greenery	55
	12	St Ives Village Nursery	55
	13	Swane's Nursery, Carlingford	35
Jan-Jun 2008	14	Gardens R Us, Kingsford	4
	15	Altra Nursery, Peakhurst	30
	16	Eden Gardens, North Ryde	5
	17	Harbord Diggers Garden Gathering	100
Jul-Dec 2008	18	Frenchs Forest	27
	19	Gardens R Us, Kingsgrove	20
Jan-Jul 2009	20	Ku-ring-gai Horticultural Society	100
	21	Vaucluse Garden Club	30
	22	Ulladulla Garden Club	120
	23	St Ives Evening Garden Club	30
TOTALS	**23 Seminars with 891 attendees at 9 different nursery outlets and 7 Garden Clubs**		

ATTACHMENT D
Irrigation Efficiency Course Details

Course 1 **Location: Hornsby Dates: 24 and 25 July 2006 Attendees: 10** **Trainer: Jeremy Cape – Cape Ability Consultants PL**	
Participant	**Organisation**
Phillip Robins	BSJ Irrigation
Yanni Mentis	Department of Energy Utilities and Sustainability
Nick Rose	Water Harvest Australia
Keith Seaman	Woollahra Council
Llewallyen Jones	Woollahra Council
Fernando Ortego	Sydney Water
Richie Griffiths	Ryde Council
Simon Freeman	Ryde Council
Chris Richmond	Bankstown Council
Tim Gilbert	Irrigation Association of Australia

Course 2 **Location: Ryde Dates: 24 and 25 October 2006 Attendees: 9** **Trainer: Jeremy Cape – CapeAbility Consultants PL**	
Participant	**Organisation**
Simon Closter	Brooks Irrigation
Richard Overall	Warringah Council
Garth Dickinson	Department of Energy Utilities and Sustainability
Daniel Long	Blue Mountains Council
Tony Spinks	Hydroplan
Shane Emms	Water Harvest Australia
Donovan Gall	Office of the Official Secretary to the Governor-General
John Gellin	University of SW
Matthew Delbeque	Automated Irrigation

Course 3 **Location: Bankstown Dates: 13 and 14 February 2007 Attendees: 8** **Trainer: Tony Spinks – Hydroplan**	
Participant	**Organisation**
Paul Johnson	Johnson Plumbing (Goulburn) PL
Paul McCullogh	Hornsby Council
Stephen Thompson	Western Plains Zoo
Jeff Wearing	Wollongong Council
Geoff Witt	Hornsby Council
Jeff Duncum	City of Sydney Council
Peter Kemp	Hornsby Council
Steven Paulis	City of Sydney Council

ATTACHMENT D CONT'D

Course 4 Location: Sydney Dates: 21 and 22 May 2007 Attendees: 17 Trainer: Tony Spinks - Hydroplan	
Participant	**Organisation**
Mark Matthews	Irrigation Association of Australia
Natalie Weekes	Hydro Logic Irrigation Services
Patrick Currie	Hydro Logic Irrigation Services
Joe Leo	City of Sydney Council
Chris Jones	City of Sydney Council
Brett Hardacre	Manly Council
Susan Butler	Lane Cove Council
Bob Batho	Lane Cove Council
Geoff Menzies	Menzies Pumps and Irrigation
Ken Gosling	Burwood Council
Chris Lane	Burwood Council
Peter Cronin	Hunter Irrigation and Water Solutions
Neil Bailey	Hunter Irrigation and Water Solutions
Dane Latham	Hunter Irrigation and Water Solutions
Wayne Hutton	Eurobodalla Council
Matthew Russell	Rustle Landscapes
Brian Walters	Townsville Council

Course 5 Location: Asquith Dates: 19 and 20 September 2007 Attendees: 15 Trainer: Tony Spinks - Hydroplan	
Participant	**Organisation**
Craig Picklum	Western Institute of TAFE
Graeme Reid	Woollahra Council
Myles Sevil	Rain 4 U
Leon Sharpe	Bland Council
Phil Turner	Hunter Irrigation and Water Solutions
Nick Wade	Woollahra Council
Jermarle Irvine	Griffith City Council
Warren Atkinson	Hunter Irrigation and Water Services
Andrew Armstrong	Griffith City Council
Brad Bird	Blacktown City Council
Daryll Cook	Penrith Council
John Galbraith	NSW TAFE
Phil Harvey	Water Well Irrigation PL
Saul Henebery	National Irrigation PL
Brian Walters	Townsville Council

ATTACHMENT D CONT'D

Course 6 Location: Bankstown Dates: 19 and 20 February 2008 Attendees: 8 Trainer: Tony Spinks - Hydroplan	
Participant	**Organisation**
Christian Fojt	Watermatic Irrigation
Joshua Ryan	URS Corporation
Marnie Macauley	Sydney Water
Nathan Pickering	Brooks Irrigation
Hannah Warner	Brooks Irrigation
Ronald Abood	Brooks Irrigation
Gary Hanlon	Liverpool Council
Warwick Bunyan	Liverpool Council

Course 7 Location: Penrith Dates: 6 and 7 May 2009 Attendees: 13 Trainer: Tony Spinks - Hydroplan	
Participant	**Organisation**
Rohan Brown	Hydroplan
Alisa Bryce	URS Australia
Damien Doyle	NSW DPI
Grant Evans	Hawkesbury Valley Irrigation
Peter Conash	Hawkesbury Valley Irrigation
Clair Hammond	Sydney Water
Aaron Leahy	Sutherland Council
Scott Machar	NSW DPI
Rick Pasqualini	Sutherland Council
Matthew Plunkett	NSW DPI
Melanie Schwecke	Sydney Water
Neale Tweedie	Hawkesbury Valley irrigation
William Yiasoumi	NSW DPI

ATTACHMENT E
Letter from NSW Minister for Water Utilities

New South Wales

David Campbell
Minister for Water Utilities
Minister for Small Business
Minister for Regional Development
Minister for the Illawarra

MO Ref: W0602095
DEUS Ref: 06-1339
SW Ref: SC 000510

Mr Tim Gilbert
The Irrigation Association of Australia Ltd
PO Box 1804
HORNSBY WESTFIELD NSW 1635

Dear Mr Gilbert

I refer to your correspondence in relation to the Outdoor Water Conservation Reference Group.

I have been advised of the valuable work that has been done jointly with the sector through the workings of the Outdoor Water Conservation Reference Group and of the valuable contribution that can yet be made.

Following your meeting with my staff, I requested the Department of Energy, Utilities and Sustainability to provide a chairperson for the Reference Group, in place of a representative of Sydney Water that had previously served this function. Under the auspices, of the Outdoor Water Conservation Reference Group, I am pleased to establish a Working Group to which I trust will facilitate ongoing consultation with industry stakeholders.

In addition, I have considered the Irrigation Associations proposed process to examine alternative long-term outdoor water conservation frameworks. I agree in-principle with the proposed review, particularly to take into account any technological changes and the Government's recent commitment, made possible by the supply augmentation works announced in the Metropolitan Water Plan, that there will be no increase on the current Level Three Restrictions.

I note that your correspondence refers interchangeably to Level Three Restrictions which, as you know, currently apply in Sydney and to permanent water restrictions which do not. By way of clarification, the current discussion does not pertain to permanent water restrictions but to appropriate water restrictions as temporary drought response measures.

All correspondence to
GPO Box 5341, Sydney NSW 2001
e: david.campbell.mp@parliament.nsw.gov.au
Fax: (61-2) 9228 3123

Ground Floor, 84 Crown Street
Wollongong NSW
Ph: (61-2) 4229 5744
Fax: (61-2) 4229 7211

Level 35, Governor Macquarie Tower
1 Farrer Place, Sydney NSW
Ph: (61-2) 9228 [illegible]
Fax: (61-2) 9228 3924

ATTACHMENT E CONT'D

I also appreciate your case for enlarging the parameters of this review to include industry stakeholders but have some amendments to the draft terms of reference. In particular, the timeframe proposed did not allow for sufficient consideration of the options, costs and feasibility of implementation, as well as full public consultation which is warranted given the Government's recent announcements with regard to water restrictions and which is important for the effectiveness of any future water restrictions, should they prove necessary.

I enclose a copy of the revised Terms of Reference with which I trust you will concur and thank you for bringing these matters to my attention. If you require further information, please contact Ms Ophelia Cowell, Policy Advisor, in my office on (02) 9228 3777.

Yours sincerely

David Campbell
Minister for Water Utilities
Minister for Small Business
Minister for Regional Development
Minister for the Illawarra

ATTACHMENT E CONT'D

Terms of Reference

a) Examine options for water conservation measures that:

1. Utilise the relevant expertise of Sydney Water, DEUS and key industry stakeholders including the lifestyle horticultural sector;
2. Will achieve water savings equal to or greater than the current Level Three Restrictions;
3. Are evidenced based;
4. Can be readily communicated to the public;
5. Are practical to administer;
6. Are readily enforceable;
7. Are practical in terms of cost of implementation;
8. Are sufficiently equitable and affordable
9. Refer to experience and current practice in relevant jurisdictions.

Proposed Milestones

Milestone 1: Identify frameworks and detailed timeframes for examination;
Milestone 2: Survey of restriction regimes in relevant jurisdictions;
Milestone 3: Examine options in accordance with Terms of Reference;
Milestone 4: Assessment of water savings;
Milestone 5: Assessment of cost impacts;
Milestone 6: Assessment of customer impacts;
Milestone 7: Assessment of consultation requirements;
Milestone 8: Report to Minister

Attachment F
Sydney Water Email on Irrigation System Check

From: TONY ROBINSON [TONY.ROBINSON@sydneywater.com.au]
Sent: Wednesday, 11 March 2009 9:13 AM
To: Tim Gilbert
Subject: IAL letter to the Minister Options
Hi Tim,
I would like to organise a meeting with you regarding the possible approach options in the letter to Minister from late last year.
Taking your options into consideration, Sydney Water have come up with a draft proposal on how we can work with the IAL.
Attached is a one pager of the draft proposal.
Could you please let me know when you are available to meet and discuss this proposal.

Regards

Tony Robinson
Project Officer, WC&R
Water Conservation and Recycling
Sydney Water
Lv16, 115-123 Bathurst st Sydney 2000
mobile 0419 478 008
ph (02)9350 5119 fax (02)9350 5942
tony.robinson@sydneywater.com.au

Attachment F Cont'd
Draft Option

Response to IAL letter dated 2 September 2008

Draft Option to utilise the irrigation industry expertise to assist the government in its object to reduce water demand.

Background

Sydney Water have worked with the IAL over several years in developing our outdoor water conservation programs. Initially the IAL were invited to have an overview in the development of the Love Your Garden Program.

Following the introduction of water restriction we entered into a tri partisan agreement with the IAL and the CRC for irrigation futures to run an urban irrigation efficiency study. More recently in 2008 they were part of a working group that had regular input into our Irrigation Maintenance and Design pilot (Irrigation System Check).

Love Your Garden

Sydney Water's "Love Your Garden" service, which costs $33, involves a trained horticulturist assessing the plants soil and microclimate of individual households gardens, the information is entered into a mobile application computer program. The program provides the customer with a detailed watering schedule for each area of their garden along with advice on how to improve their garden.

Irrigation System Check

The Irrigation System Check pilot program was completed in 2008. The pilot developed of a tool to rank irrigation systems between 1-6 stars. Approx 100 systems were assessed as part of the pilot. Customers who participated in the pilot received a report listing any problems with their systems and how they could improve them to receive a higher rating.

Option

Sydney Water would like to propose an option that would benefit the IAL, Sydney Water and our customers. The option entails customers who have received the "Love Your Garden" service be eligible for a System Check assessment of their spray irrigation system. If their irrigation system is rated for example at 5 stars or higher the customer could apply for an exemption to use their systems before 10am and after 4pm two days per week.

How it would Work

Sydney Water would licence IAL members to use the Irrigation System Check program. Suitable qualified irrigation professionals would be trained in the use of the System Check tool. The IAL member would provide the results of each assessment to the IAL the IAL would then aggregate the data and provide electronic records of all complete assessments to Sydney Water. These would them be checked prior to issuing an exemption application. Each exemption application could them be accompanied with a signed commitment to follow the LYG water schedule.

Training

Sydney Water would develop and deliver the first 2 – 3 training sessions though a suitable accredit training provided eg NSW TAFE. After which any further irrigation professionals wishing to be trained would do so at their own cost.

Auditing

Sydney Water would engage an auditor to do random audits of irrigation systems to ensure compliance. Any person found defaulting the system would be deregistered as Irrigation System Check assessors.

ATTACHMENT G
IAL's Business Case for
Industry Run Water Restrictions Exemption Framework

Sydney Irrigation System Check Program

Preliminary Information for Prospective Assessors

1. Introduction

Sydney Water has proposed a two year pilot scheme for enabling household exemptions from water restrictions. The pilot will link the Love Your Garden service that Sydney Water has offered since 2006 with an Irrigation System Check as described below.

The option offered by Sydney Water would enable customers who have received the Love Your Garden site assessment to have an Irrigation System Check assessment of their spray irrigation system[2]. Where the irrigation system meets minimum rating levels, the customer would be eligible for an exemption to use their irrigation systems before 10am and after 4pm two days per week as per current water restrictions for drip systems.

Sydney Water will licence the Irrigation System Check program to IAL. IAL will refer assessment work to Assessors that are registered with IAL for this program. The Assessors will undertake the site assessments, and record details of that assessment, and provide the results of each assessment to the IAL. The IAL will then aggregate the data and provide electronic records of all complete assessments to Sydney Water. These records would then be checked by Sydney Water prior to issuing an exemption application to the customer.

Sydney Water will engage an auditor to do random audits of irrigation systems checked by Assessors to ensure compliance and quality of assessment by Assessors. Any Assessor found to be defaulting the system will be deregistered as an Irrigation System Check Assessor.

There will be four steps to becoming an Assessor:

1. Meeting IAL specified prerequisites;
2. Undertaking and passing the Sydney Water approved Irrigation System Check training;
3. Applying to IAL to be an Assessor;
4. Signing an agreement with IAL to register and participate as an Assessor.

This document has been prepared on the basis of a description of the pilot scheme provided by Sydney Water, on input received from potential Assessors at a meeting with IAL on 26 May 2009, and based on IAL consideration of this input and its own organisational operations. The document briefly outlines relevant information about the steps to becoming an Assessor, and provides basic information to prospective Assessors about the administrative arrangements, Site Assessment Fee Schedule (including Assessor fees), and roles and responsibilities of Assessors operating within this pilot scheme.

Note that some of the details for the pilot program are still being determined.

[2] The Irrigation System Check pilot program was completed in 2008 and produced a tool to rank irrigation systems between 1-6 stars. Approximately 100 systems were assessed as part of the pilot. Customers who participated in the pilot received a report listing any problems with their systems and how they could improve them to receive a higher rating.

IAL is keen for the scheme to be professional, transparent and to retain and build the integrity, trust and profile of the irrigation industry with the public and Sydney Water, while at the same time being open to the broader irrigation industry and operated in an equitable and efficient manner for Assessors. The processes outlined in this document for managing this pilot scheme have been developed with these principles in mind.

2. Prerequisites and Training for Assessors

To be eligible to be an Assessor in this pilot scheme a person will need:

i) either IAL Certification (Certified Irrigation Designer, Installer, Agronomist, Contractor) or Certificate III or higher in Irrigation; AND

ii) have undertaken and passed the Irrigation System Check training course.

People without these two requirements will not be eligible to be an Assessor within this pilot scheme.

Prerequisites

IAL recognises that the prerequisite certifications and qualifications listed above may need to be revised throughout the pilot pending numbers and availability of willing Assessors and quantum of customers seeking site assessments under this pilot program. In the first instance though IAL will endeavour to provide/co-ordinate appropriate training and encourage members to seek Certification to increase the pool of Assessors available to this pilot program.

Note that IAL is a Registered Training Organisation under the national training framework and can arrange Recognition of Prior Learning (RPL) for people with extensive irrigation industry experience but no formal qualifications.

Training

Sydney Water will develop and deliver the first 2 – 3 training sessions though a suitable registered training provider eg NSW TAFE. After these initial sessions any further irrigation professionals seeking to be admitted as an Assessor will need to undertake the training through a registered training organisation at their own cost.

Training details are currently being developed by Sydney Water. Training is expected to take 1 to 2 days, is likely to be run through a TAFE, and will include an assessment component which Assessors will need to pass in order to participate in this pilot scheme.

3. Assessor Agreement with IAL

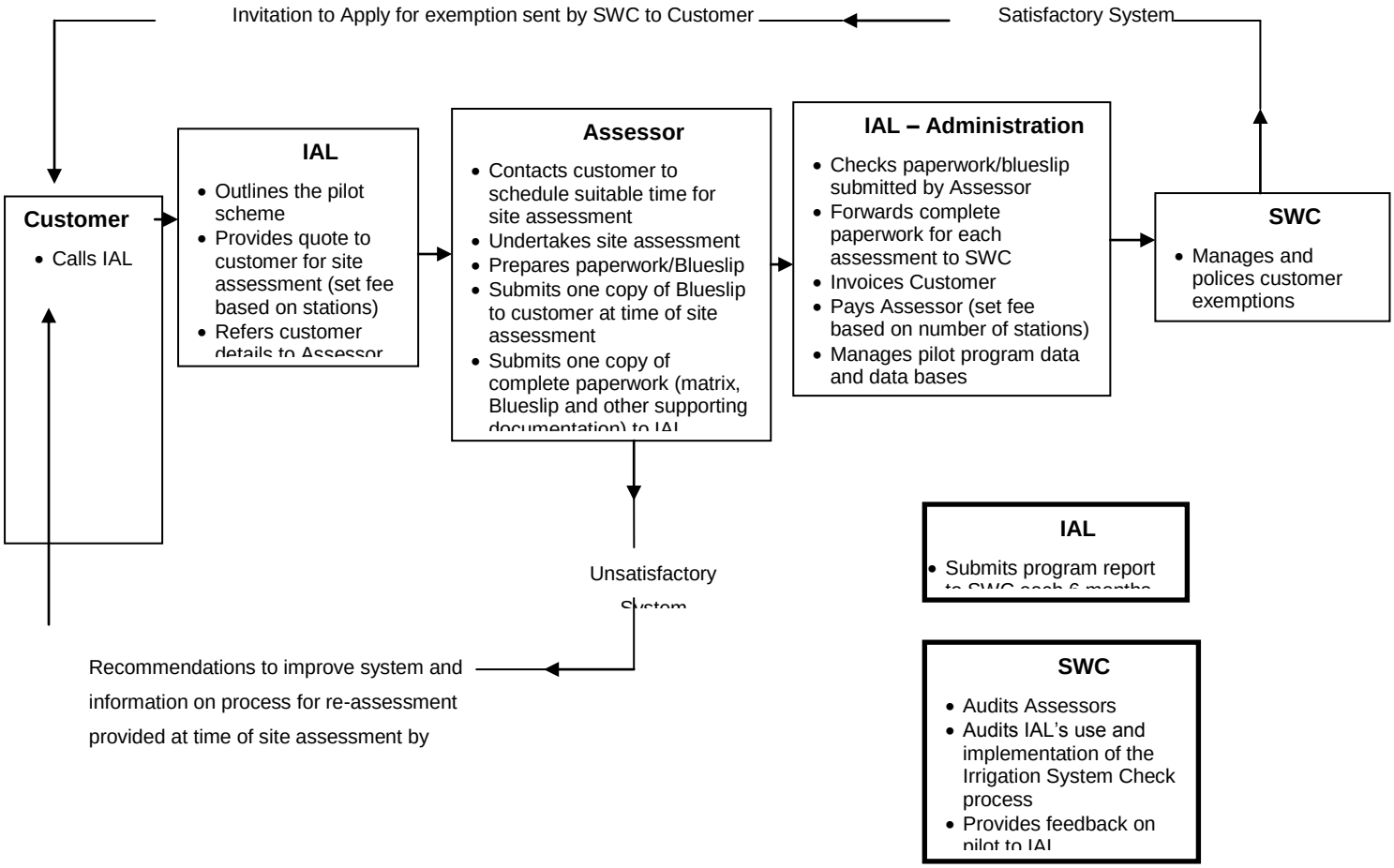
Assessors will need to sign an agreement with IAL to participate as Assessors in this program. The agreement will set out the relative roles and responsibilities of the IAL and Assessors and will include, but not be limited to, requirements for Assessor:

- availability to the pilot scheme;
- professionalism in conducting site assessments under the pilot scheme;
- use of the Irrigation System Check processes;
- maintaining records/paperwork in a legible form, and providing this paperwork to IAL;
- meeting set timeframes for customer service and interactions with IAL;
- maintaining IAL pre-requisites to be an Assessor;
- maintenance of appropriate insurances and levels of insurance;
- to assume legal responsibilities and liabilities for actions/advice provided on site and for any claims made by the customer in relation to the Assessors activities and advice provided during the site assessment.

4. Administrative Process

The pilot will involve four types of stakeholders, namely the customer, Irrigation Australia Limited (IAL), the Irrigation System Check Assessor and Sydney Water Corporation (SWC). The relationship between these stakeholders, and the process for management of each site assessment, is shown in Figure 1 below.

Figure 1: Proposed Administrative Process



4.1 Invoicing and Financial Risk of Non-Payment

An important element in the proposed administrative process is that IAL will resource the invoicing of customers **and IAL will assume the financial risk for non-payment of customer invoices.** IAL did consider either seeking SWC assistance to manage this financial risk through its normal billing processes or requiring up-front full payment from the customer prior to site assessment. However, in the interests of:

- demonstrating to SWC and Government the irrigation industry commitment and capacity to manage this pilot;
- generating trust with the customer base; and
- simplification of the process;

IAL has agreed to assume this financial risk. This is a substantial contribution by IAL to this pilot program and to its members.

4.2 Zones

IAL will divide the Sydney Water area of operation into zones so as to minimise the Assessor travel times and thereby reduce the site assessment costs to the customer, which in turn increases the marketability and accessibility of the pilot program to the general public.

Assessors will need to nominate preferred zone(s) at the time of applying to IAL to become an Assessor. Assessors will then be included in a rolling list of Assessors operating in each zone.

It is anticipated that SWC area of operation will be divided into approximately five nominal zones roughly equating to north, south, west and east Metro zones, and an Illawarra zone. The boundaries of the zones will be based on Local Government areas. No zone boundaries have been determined by IAL at this stage.

Site assessments will be allocated from a rolling list of all Assessors operating within each zone.

4.3 Batching of Customer Referrals to Assessors

IAL will refer customer details to Assessors on a rolling list of available Assessors within the relevant zone. To further minimise site assessment costs and travel times and maximise potential Assessor cost efficiencies, IAL will refer 4 consecutive customers to the next Assessor on each zone list. This "batching" will maximise the potential for the Assessors to schedule the batch of site assessments in the most cost-efficient manner. Four site assessments is considered a reasonable batch, as it equates to approximately one day of work for the Assessor.

Notwithstanding this, IAL has no control over the timing of the customer calls. So, in the interests of customer satisfaction and overall professionalism of the pilot program, Assessors will need to have undertaken the site assessment within a maximum of 3 weeks of referral of customer details by IAL. i.e. IAL will seek to operate the scheme as far as reasonable to maximise the efficiency of the scheme for Assessors, but ultimately will not compromise customer satisfaction. See limits on Process Time in Section 4.4 below.

Note, that to ensure customer waiting times are minimised, Assessors will also need to indicate to IAL within one working day whether it accepts a site assessment referral. Should an Assessor decline a referral then the batching sequence to this Assessor will cease and this Assessor will go to the end of the rolling list for the zone. The next Assessor on the rolling list for that zone will be offered the next batch of customer referrals.

4.4 Limits on Process Times

The professionalism and level of community service offered by this program will be a key factor in any decision by Sydney Water and Government about progressing beyond a pilot stage of this program. Professionalism and community service will best be demonstrated in maintaining minimum standards for implementation of the pilot, including integrity of the site assessment process and timeliness of service to the customer.

The integrity of the site assessment process will be maintained through training of Assessors and Sydney Water's independent Assessor audit process.

Timeliness of customer service will be managed through Assessors signing an Agreement with IAL to become an Assessor, where the Agreement (amongst other things) stipulates the maximum time limits on each of the Administrative processes for which IAL or the Assessor has control. These processes and timeframes are:

- IAL referral of customer details to Assessor: within 3 working days of Customer call;
- Assess accepts referral: within one working day of IAL referral to Assessor;
- Assessor contacts customer to arrange site assessment: within 2 working days of IAL referral to Assessor;

- Assessor undertakes site assessment: within 3 calendar weeks of IAL referral to Assessor;
- Assessor submits completed paperwork/BlueSlip to IAL: within 3 working days of site assessment;
- IAL sends complete site assessment paperwork to Sydney Water: within 3 working days of receipt of complete paperwork.

Provided complete paperwork is submitted by the Assessor to IAL and the assessment indicates the irrigation system meets satisfactory rating levels, then the maximum timeframe:

- for the whole process will not exceed approximately 5 calendar weeks – which compares with many public sector guidelines for agency response to written matters within 6 weeks;
- from the time of site assessment to referral of paperwork to Sydney Water will not exceed 6 working days.

Importantly:

- the timeframes given above are maximum timeframes, and it is expected that in most cases the timeframes will be substantially less; and
- the process and maximum timeframes will be stated by IAL to the customer at the outset.

4.5 Standard Forms

Standard forms will be developed by Sydney Water and IAL for Assessors to fill out in relation to each site assessment. The forms have not yet been developed, but it is expected there will be:

i) a Customer Agreement to be signed by the customer prior to the commencement of the site assessment to demonstrate an understanding of the service being provided, and to enable Assessor access to the property;

ii) a standard Irrigation System Check matrix form to enable recording of system details and calculation of the star rating level of the irrigation system at each site;

iii) a Blue Slip that will be similar to a motor vehicle pink slip – with summary of the findings of the Irrigation System Check site assessment including:
   a. an unequivocal statement about whether or not the irrigation system meets minimum rating levels to be eligible for an exemption from water restrictions; and
   b. in the event the system does not meet minimum standards, some brief recommendations for improving the system to meet the minimum rating level for exemption

iv) a form for brief statements of any abnormal methodology or approach used by the Assessor to measure any Irrigation System Check parameter eg uneven distribution accepted because of nature of the garden space etc.

The standard forms will need to be used by Assessors, and all records will need to be maintained in a legible manner and forwarded to IAL within 3 working days of the site assessment being undertaken.

The customer will be provided only with the Blueslip and the signed Customer Agreement.

5. Fee Schedule and Assessor Payments

IAL has developed a Fee Schedule at Table 1 which is largely based on a recovery cost model. The component costs of each Fee Type are discussed in more detail below.

Table 1: Proposed Site Assessment Fee Schedule and Allocation of Fees

Fee Type	Total Cost to Customer	Allocation to Assessor/IAL	
		Assessor	IAL
Base Fee (0 to 6 stations)	$194*	$122.50	$71.50
Follow Up Site Assessment (0 to 6 stations)	$150**	$78.50	$71.50
Default (No Show) Fee	$95	$45	$50

*an additional $17.50 fee will be payable for each station above the base 6 stations – with this fee allocated to the Assessor.

** an additional $8.75 fee will be payable for each station above the base 6 stations – with this fee allocated to the Assessor.

Base Fee

Potential Assessors at the 26 May 2009 meeting advised that a site assessment for 0-6 stations would take approximately 1.25 hours, including completion of paperwork, with an additional 15 minutes for each additional station.

A base hourly rate of $70 per hour has been used to calculate the Assessor components of this fee structure. This hourly Assessor rate has been selected to maintain the overall marketability of the pilot program as well as enable reasonable cost recovery for Assessors. It should be noted that:

- the Assessor has reduced business costs and financial risk because of IAL's willingness to assume the role of invoicing and risk of non-payment of those invoices;
- there are broader benefits that may be generated for the irrigation industry through the successful implementation of the pilot program, including in some cases new design or supply of equipment and installation or repair services; and ultimately
- participation as an Assessor is purely voluntary.

The base Assessor site assessment component (0 to 6 stations) therefore equates to $87.50, with an additional $17.50 per station for each station above the first 6 stations.

The Assessor travel time component will be minimised by the use of zones as specified in section 2.2., and also by referral of "batches" or consecutive customers to Assessors as specified in section 2.3. The travel time is therefore assumed at 0.5 hours per site assessment. Travel time therefore equates to a cost of $35 per assessment.

The aggregate base fee for the Assessor is therefore $122.50 (comprised of $87.50 site assessment and $35 travel time), with an additional fee of $17.50 per station also allocated to the Assessor.

IAL Administration and Business Costs

IAL administration and business costs includes time taken to administer each assessment including call centre, invoicing and follow up, payment of assessors, management of paperwork to Sydney Water, maintaining overall records of the pilot program and reporting to Sydney Water, plus costs to manage the financial liability associated with non-payment of invoices. The recovery cost for these IAL services has been calculated at $71.50 per site assessment.

Note that the management of financial liability is a large proportion of these IAL costs, but is critical to a small, not-for-profit organisation such as IAL, and is important for managing the risks to the broader IAL membership across the country.

Minimum "No Show" Fee
The customer will need to be in attendance at the time of the site assessment, and will need to sign a standard form enabling access to the property by the Assessor. IAL will inform the customer during the initial customer call of the need to be in attendance at the time of the site assessment.

IAL will invoice a "no show" fee to the customer in the event that customer is not available at the time scheduled and agreed between the Assessor and the customer for the site assessment.

The "no show" fee will be $95. The Assessor will receive $45 of this fee, which is equivalent to the 0.5 hours travel time for the Assessor plus $10 for the nominal time for arranging the site assessment and completing "no show" audit trail requirements for IAL. The remainder of this fee will cover IAL administration time, and serve as a deterrent for "no show". This fee will be explained to the customer by IAL during the initial customer call to IAL.

Note that the payment of "no show" fees to Assessors will be subject to rules which will enable IAL to confirm "no shows" directly with the customer and to generate an audit trail on "no shows".

Note also that it is highly likely that "no show" will also equate to a high proportion of non-payments of invoice, with this financial risk falling to IAL.

Follow-Up Site Assessment Fee
The follow up site assessment fee (for systems that did not meet a specified minimum rating level on the first site assessment) will be set at 50% of the Assessor assessment costs for the first site assessment (because there is less assessment to be done), plus Assessor travel time of 0.5 hours, plus the IAL administration fee which does not change irrespective of whether this is a second assessment. The follow-up site assessment fee will therefore be $150 for 0 to 6 stations, plus $8.75 for each additional station.

6. Marketing

Marketing details are still being arranged. However, it is expected that at a minimum:

- Sydney Water will do a direct mail out to its Love Your Garden customers;
- both Sydney Water and IAL will include information and guidance about the program on their websites; and
- IAL will make press releases about the program.

It is really important that the public information about this program is accurate and consistent. To assist Assessors and retailers in this regard, IAL will also work with Sydney Water to prepare a common flyer which will be made available to anyone who wishes to use it, with room available on the flyer for individual company logos.

Other marketing opportunities will also be examined.

Attachment H
NSW DPI Response to IAL on Certified Irrigation Professional Scheme in Water Smart Farms project in Western Sydney

Hi Tim,

We have had a discussion about IAL's proposal and would like to have a teleconference to expand further on the proposals.

Particularly we are interested in the IAL cert framework, the use of IAL accredited auditors to contribute to a team of auditors to make recommendations for upgrades and the use of IAL professionals to evaluate the success of retrofit work completed. I realise that you have identified a potential conflict with the last two items and this is something that we can discuss. Depending on cost we may also be interested in the WSF program evaluation. Can you give me an idea of when you might be available for a teleconf to progress this- perhaps Thursday or Friday this week or Tuesday the following week? Probably need to allocate an hour for it.

Cheers

Brett

Brett Upjohn
Leader Natural Resource Projects
NSW Department of Industry and Investment
PO Box 408 QUEANBEYAN, NSW 2620
Level 1, 28 Morisset St, Queanbeyan
phone: 02 6298 0808
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Attachment I
Home Garden Water Savings Seminars
Survey Data Summary

Watering method currently used[3]:	
Hand held hose	80%
Drip irrigation	18%
Sprinklers	6%
Seminar information you intend using[4]:	**No. of mentions**
Can use less water than currently	24
Soil type influences watering needs	11
Test soil before and after watering	23
Improve soil structure	11
Use of mulch	45
Different plants have different water needs	10
Advantages of drip	16
Use hose trigger nozzle	12
Use water crystals and/or wetters	28
Check water flow rates	2
Use good quality potting mix	3
Use of grey water	5
Water mornings vs night	2
Water root zone	3
As a result of seminar you would consider installing:	
Drip system?	Yes: 51%
	No: 11%
	Maybe: 38%
Rainwater tank?	Yes: 56%
	No: 16%
	Maybe: 28%
Greywater system?	Yes: 35%
	No: 38%
	Maybe: 27%
Would you consider making changes to your system as a result of this seminar?	Yes: 58%
	No: 18%
	Maybe: 24%
Please rate the seminar[4]	
	Excellent: 5%
	Very good: 83%

[3] Note that percentage adds to more than 100% as some participants used multiple irrigation methods.
[4] Results are from 89 respondents, not the total 115 respondents.

	Fair: 12%
	Poor: 0
Suggestions to improve (few commented)	Longer session
	Longer question time
	More on greywater, tanks.

ATTACHMENT J
Irrigation Efficiency Course May 2009
Audit Findings

Irrigation Efficiency Course Data - Sydney May 2009						
Course Participant	**Where was Audit Undertaken**	**Distribution Uniformity - DU (%)**	**Plant Water Requirement (mm/week)**	**Irrigation Water Required at Current DU (mm/week)**	**Irrigation Water Required at 75%DU (mm/week)**	**Potential % Water Savings**
Neale Tweedie, Grant Evans, Peter Conasch	Atlas Turf	54.00	30.85	57.13	41.13	28.00
Meleanie Schwecke	Paul Keating Park, Blacktown	50.00	5.57	11.14	7.42	33.33
Damien Doyle	Dural	71.00	124.00	174.65	165.33	5.33
Matt Plunkett	Kong & Kvistena, Austral	43.00	3.30	7.67	4.40	42.67
Scott Machar	Dural Vege	71.00	1.18	1.66	1.57	5.33
Alison Bryce	Gymea Bay Oval	53.00	13.96	26.34	18.61	29.33
	Average DU	**57.00%**			**Average Potential Water Savings**	**24.00%**

Attachment K
Case Study
Efficiency Audit of Warrina St Oval, Berowra

Report on Irrigation Systems at

Berowra Oval and Warrina Street Oval

Introduction
This report provides a record of the results of irrigation audits carried out at Hornsby Council's Berowra Oval on 24 July 2006, and Warrina Street Oval on 25 July 2006.

Background
The Irrigation Association of Australia (IAA) runs a Certified Irrigation Auditor – Landscape (CIA-L) course across Australia. The CIA-L course involves theory and practical on-site sessions to gather irrigation water-use data and test the performance of landscape irrigation systems, including checking pressure and conducting distribution uniformity measurements.

The IAA ran a CIA-L course in the Hornsby local government area on 24 and 25 July 2006. The course was attended by 10 participants from local governments, irrigation installation companies, water engineering consultants and State Government agencies including Sydney Water and the Department of Energy Utilities and Sustainability. Hornsby Council kindly offered the use of its Berowra and Warrina Street Ovals for use in the practical on-site sessions.

While this report has been prepared in good faith, Council should use the results as guidance only as:

- the data was collected as part of a training exercise where the focus was predominantly on the audit process rather than on the data results; and
- the data was collected in overcast and windy conditions, which are not ideal for this type of audit process and which may have affected the results.

Notwithstanding the above, the report provides the results of distribution uniformity assessments at Berowra and Warrina Street Ovals undertaken on 24 and 25 July 2006. A more comprehensive audit process was undertaken at Warrina Street on 25 July, which also enabled plant water requirements and irrigation scheduling to be determined for this site (for December), as well as an estimate of potential water savings and water cost savings to be calculated.

Results
The data from distribution uniformity assessments for Berowra and Warrina Street Ovals are provided in Attachment 1 and 2 respectively. At both ovals the distribution uniformity was 66%, indicating there is considerable scope to improve the uniformity of application, and thereby achieve savings in water use and water costs.

The water savings that can be achieved from increasing the distribution uniformity to 80% are estimated at 187.2 KL at Warrina Street Oval for the month of December during peak irrigation season. This equates to an estimated potential saving of $235.87 for the month of December. The calculations of these estimates are at Attachments 3, 4 and 5.

Misting was clearly observable from all sprinkler heads at Warrina Street Oval, which may affect uniformity. There can be many reasons for misting, including but not limited to:

i) pressure that is too high for the sprinkler heads;
ii) need for maintenance of the sprinkler heads.

Conclusion

The estimated water and cost savings presented in this report relate to the month of December only. Clearly, if taken over an entire irrigation season, there are substantial water and cost savings that could be achieved by increasing the distribution uniformity of the irrigation system at Warrina Street Oval. Given that Berowra Oval had a similar distribution uniformity to Warrina Street there are likely to be potential water savings and cost savings of similar magnitude to those calculated for Warrina Street.

It is recommended that Council undertake maintenance of the sprinkler heads at both Warrina Street and Berowra Ovals to assess whether this fixes the observed misting issues, and improves distribution uniformity. Should misting or poor distribution uniformity persist, the operator should consider engaging the services of a specialist irrigation designer or contractor to identify alternative remedial actions.

Attachment K Cont'd
Distribution Uniformity Assessment: Berowra Oval

Date: 24 July 2006
Plant Material: Couch: Warn Season Turf
Density Factor: Average
Microclimate Factor: Average
Soil Type: Sandy Loam
Root Zone Depth: 40mm

Distribution Uniformity Measurements

Station Number 2 (depth in mm)	**Between Stations (depth in mm)**	**Station Number 6 (depth in mm)**
15 Minute Run Time		**15 Minute Run Time**
2.0	2.5	0.7
3.5	2	1.8
3.2	2.5	1.8
2.4	3	2.8
3.5	2.5	1.9
2.5		
2.3		
1.8		

Low Quarter Distribution Uniformity (LQDU)
LQDU is a measure of the uniformity that compares the average precipitation of the lowest one quarter of the field to the average precipitation rate for the entire field.

For LQDU at Berowra Oval the LQDU was determined using Stations 2 and 6, as being reasonably representative of the remainder of the field based on visual assessment.

LQDU = (Average of lowest quarter readings)/(average of all readings) * 100

At Berowra Oval there were 18 catch cans (readings) taken. Lowest quarter is therefore lowest five readings.

Lowest five readings = 0.7, 1.8, 1.8, 1.8 1.9
Lowest quarter average = 1.6mm

Total Average = 2.4mm

LQDU = (1.6/2.4)*100
= 66%

Attachment K Cont'd

Distribution Uniformity Assessment: Warrina Street Oval

Date: 25 July 2006
Plant Material: Couch: Warn Season Turf
Density Factor: Average
Microclimate Factor: Average
Soil Type: Loam
Root Zone Depth: 160mm

Distribution Uniformity Measurements

Station Number 6 (depth in mm) **10 Minute Run Time**	**Between Stations** (depth in mm)	**Between Stations** (depth in mm)	**Between Stations** (depth in mm)	**Between Stations** (depth in mm)	**Between Stations** (depth in mm)	**Between Stations** (depth in mm)	**Station Number 8** (depth in mm) **10 Minute Run Time**
1.5	1.4	1.5	1.8	1.5	1.8	2.5	0.5
2.8	2.0	1.2	1.2	1.6	2.0	2.0	2.5
3.0	3.0	2.8	1.7	1.8	1.9	1.9	2.0
1.2	3.2	2.4	1.8	1.6	1.3	1.3	2.2
	1.8	1.6	1.4	1.5	1.7	1.7	0.8

Low Quarter Distribution Uniformity (LQDU)
LQDU is a measure of the uniformity that compares the average precipitation of the lowest one quarter of the field to the average precipitation rate for the entire field.

For LQDU at Warrina Street Oval the LQDU was determined using Stations 6 and 8, as being reasonably representative of the remainder of the field based on visual assessment.

LQDU = (Average of lowest quarter readings)/(average of all readings) * 100

At Warrina Street Oval there were 39 catch cans (readings) taken. Lowest quarter is therefore lowest five readings.

Lowest five readings = 0.5, 0.8, 1.2, 1.2, 1.2, 1.3, 1.3, 1.4, 1.4, 1.5
Lowest quarter average = 1.2mm

Total Average = 1.8mm

LQDU = (1.2/1.8)*100
= 66%

Attachment K Cont'd

Plant Water Needs and Irrigation Scheduling

Warrina Street Oval With Distribution Uniformity at 66%

ITEM	SOURCE		VALUE	UNIT or FUNCTION
I. PLANT WATER REQUIREMENT				
A. Plant material	Audit or Planting Plan		Warn Season Turf	classification
B. Reference period	Judgment		28	days
B1. Daily evapotranspiration	Various sources		22mm/week for Dec	
C. Reference ET (ET_o)	Calculation	B * B1	3.2mm/day	millimetres of water
D. Landscape coefficient (K_L)	K_s _0.5_x K_d _1_x K_{mc} _1_		0.5	plant specific multiplier
(Optional) allowable stress	K_L ____x K_{as} ____		*NA*	*site specific multiplier*
E. Plant water requirement	ET_o x K_L	C x D	44.8mm/month	millimetres
2. IRRIGATION WATER REQUIREMENT				
F. Precipitation rate	Audit or Calculation		10.8mm/hr	millimetres per hour
G. Distribution uniformity	Audit or Estimate		66% (from Att 2)	efficiency adjustment
H. Irrigation water requirement	Plant H20 require/LQDU	E/G	71mm	millimetres
I. Total runtime per period	Irrigation H20 require/PR	(H/F)x60	395 minutes	minutes
3. SCHEDULING REQUIREMENTS				
J. Rootzone soil type	Audit or Estimate		sandy loam	classification
K. Avail. water hold. capacity	Table 5 (in Soils)		115mm/m	millimetres/metre soil
L. Active rootzone depth	Audit or Estimate		160mm	millimetres
M. Rootzone available water	AWHC x active rootzone	K x L	18.4mm	millimetres
N. Working storage	Rootzone RAW x MAD (Permit 90% depletion)		16.56mm (90% x 18.4mm)	budget multiplier (mm)
O. Number of irrigation days	Plant H_20 require/WS	E/N	2.71 days	days in a period
P. Total runtime per irrigation day	Total run-period/# irrig.days	I/O	146	minutes
Q. Runtime per cycle	Audit or Estimate		40	minutes
R. Cycles per irrigation day	Total run-day/runtime-cycle	P/Q	4	repeats to avoid runoff
4. WATER VOLUME REQUIREMENT				
S. Flow rate (L/min)	Water meter or calculate	From meter	247litres/minute per station	Litres per minute
T. Water volume (L)	Total runtime x flowrate	I x S	97.6 KL/month per station	Litres
U. Water volume (kL)	Water volume	T/1000	97.6KL/month per station	kilolitres
V. Water cost per period per station	Cost per 100 kL ($1.26/KL)	$ x U	$122.93/month per station	Dollars
W. Water Volume and Cost for Site	No. Stations * volume & cost	No. Stations * U, V	$1106.37 for December 878.4KL for December	

Attachment K Cont'd

Plant Water Needs and Irrigation Scheduling

Warrina Street Oval With Distribution Uniformity at 80%

ITEM	SOURCE		VALUE	UNIT or FUNCTION
I. PLANT WATER REQUIREMENT				
A. Plant material	Audit or Planting Plan		Warn Season Turf	classification
B. Reference period	Judgment		28	days
B1. Daily evapotranspiration	Various sources		22mm/week for Dec	
C. Reference ET (ET_o)	Calculation	B * B1	3.2mm/day	millimetres of water
D. Landscape coefficient (K_L)	K_s _0.5_x K_d _1_x K_{mc} _1_		0.5	plant specific multiplier
(Optional) allowable stress	K_L ____x K_{as} ____		NA	*site specific multiplier*
E. Plant water requirement	ET_o x K_L	C x D	44.8mm/month	millimetres
2. IRRIGATION WATER REQUIREMENT				
F. Precipitation rate	Audit or Calculation		10.8mm/hr	millimetres per hour
G. Distribution uniformity	Audit or Estimate		80% (improve on audit)	efficiency adjustment
H. Irrigation water requirement	Plant H20 require/LQDU	E/G	56mm/month	millimetres
I. Total runtime per period	Irrigation H20 require/PR	(H/F)x60	311 minutes	minutes
3. SCHEDULING REQUIREMENTS				
J. Rootzone soil type	Audit or Estimate		Sandy loam	classification
K. Avail. water hold. capacity	Table 5 (in Soils)		115mm/m	millimetres/metre soil
L. Active rootzone depth	Audit or Estimate		160mm	millimetres
M. Rootzone available water	AWHC x active rootzone	K x L	18.4mm	millimetres
N. Working storage	Rootzone RAW x MAD (Permit 90% depletion)		16.6mm (90% x 18.4mm)	budget multiplier (mm)
O. Number of irrigation days	Plant H_20 require/WS	E/N	2.71 days	days in a period
P. Total runtime per irrigation day	Total run-period/# irrig.days	I/O	115	minutes
Q. Runtime per cycle	Audit or Estimate		40	minutes
R. Cycles per irrigation day	Total run-day/runtime-cycle	P/Q	3	repeats to avoid runoff
4. WATER VOLUME REQUIREMENT				
S. Flow rate (L/min)	Water meter or calculate	From meter	247litres/minute per station	Litres per minute
T. Water volume (L)	Total runtime x flowrate	I x S	76.8 KL/month per station	Litres
U. Water volume (kL)	Water volume	T/1000	76.8KL/month per station	kilolitres
V. Water cost per period per station	Cost per 100 kL ($1.26/KL)	$ x U	$96.77/month per station	Dollars
W. Water Volume and Cost for Site	No. Stations * volume & cost	No. Stations * U, V	$870.91 for December 691.2KL for December	

Attachment K Cont'd

Potential Water and Cost Savings for December

Warrina Street Oval

Improving Current Performance to 80% Distribution Uniformity

Water Volume at current DU = 878.4KL (from Attachment 3)

Water Volume at 80% DU = 691.2KL (from Attachment 4)

Possible Water Saving for December = 878.4KL – 691.2KL
= 187.2KL

Water Costs at $1.26 per KL

Possible Water Cost Savings for December = $235.87

Attachment L

Letter from Sydney Water Inviting Development of a Program to Prove the Irrigation System Check Approach

WATER

30 July 2009

Tim Gilbert
Irrigation Australia Limited
Industry Development Officer
PO Box 1804.
Hornsby NSW 1635

Dear Tim

Thank you for meeting with Tony Robinson and myself on the 30 May 2009 to discuss the way forward working with Sydney Water to improve irrigation efficiency in light of the introduction of Water Wise rules.

As you are aware Sydney Water have been working closely with the IAL to develop the 'System Check' pilot program with the aim to provide exemptions for efficient spray irrigation systems to be used during water restrictions. However the lifting of restrictions has taken away the customer incentive to participate in the program as it was initially proposed and a new incentive needs to be sourced for the pilot to proceed.

At our meeting in May we discussed Sydney Water's goal is to drought proof our area of operation to avoid the need for future water restrictions. In aiming to achieve this we have made substantial investment in water supply infrastructure and will continue to deliver and develop water efficiency programs where they are cost competitive against supply options and where they fill gaps in existing initiatives, for example; regulatory frameworks such as BASIX, WELS,WES and Water Wise Rules).

At the meeting you indicted that the IAL are in favour of the lifting of restrictions but considers there is more work that can and should be done to sustain outdoor water savings in the longer term. The IAL are motivated to work with Sydney Water to participate in a pilot program such as System Check or similar to achieve outdoor water savings that could either be:

i) Implemented as a permanent program now to minimise the potential for the reintroduction of restrictions in the future. or

ii) Could be re-introduced in lieu of restrictions if the need arises in the future – which would enable the industry and the community to avoid the substantial costs of water restrictions.

WATER

Sydney Water will continue to work with the irrigation industry to develop an industry delivered program that sets standards, increases industry professionalism and encourages widespread adoption of best practice domestic irrigation to help sustain water savings over time.

At the meeting we agreed to work together towards a two stage pilot program to prove the Love Your Garden Irrigation System Check scheme that was being developed where

Stage 1 would essentially be a small scale research project to measure actual water savings from the combined LYG Irrig System Check approach already developed by SWC, and begin the process to build and grow the recognised water efficiency expertise in the irrigation industry. The pilot would be Sydney based and would possibly involve a rebate as an incentive. The value of the rebate would primarily determine this initiative's cost effectiveness when compared to Sydney Water's other demand management initiatives; and

Stage 2 would, pending the results of Stage 1, seek additional funding sources to extend the program to other jurisdictions across NSW, or broader.

The interim actions and timeframes discussed were:

- Sydney Water to obtain 2009/10 water use data for Sydney - free from the noise of restrictions;
- Both IAL and Sydney Water to develop the proposal for Stage 1 ready for implementation in spring 2010 ; and
- develop a funding proposal and seek funding sources for Stage 2 after 2010/11 summer and pending results of stage 1

Sydney Water looks forward to working with IAL to develop the Stage 1 pilot program over the coming months and working towards our agreed goal of achieving sustainable water savings.

Regards

Andrew Kirkwood
Manager Customer Sustainability
Sydney Water