DEVELOPMENT OF TRAINING MATERIAL AND PROVIDING TRAINING FOR IMPLEMENTATION OF THE WATER USE EFFICIENCY ACCOUNTING REPORT OF THE WATER ADMINISTRATION SYSTEM

Report to the

WATER RESEARCH COMMISSION

by

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NB Systems

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The publication of this report emanates from a project titled *Development of training material and providing training for implementation of the water use efficiency accounting reports of the Water Administration System* (WRC Project No. K8/878).

EXECUTIVE SUMMARY

Introduction

The Directorate of Water Use Efficiency of the Department of Water Affairs (DWA) is tasked to improve agricultural water management guided by the Water Conservation and Water Demand Management strategy (WCWDM) in the agricultural sector. In the management of water loss control, one of the major responsibilities of the sub-directorate is water accounting and auditing. This function requires the sub-directorate (Water Loss Control) to report on water use on government irrigation schemes, indicating both beneficial and non-beneficial water uses, with the objectives of reducing the unaccounted-for water component. Another important responsibility of the sub-directorate is the training of water control officers to effectively deliver against their water management responsibilities.

At the end of 2008 a Water Use Efficiency and Accounting (WUEA) report was developed as part of the Water Administration System (WAS) through funding by DWA and project management by the Water Research Commission (WRC). This WUEA report was successfully implemented at thirteen irrigation schemes and training was done on the different schemes and at a number of workshops.

Experience from this project has shown that the newly developed WUEA report is easy to use and that everybody prefers the new report over the previous Excel-based report. To build on the successes of this project and to ensure that the WUEA report is actively being used in a sustainable manner, it was recommended that much more should be done in terms of training courses and training material. This follow-on project funded by the WRC, is an extension of the previous project and the main focus of this project is the development of training material and documentation.

Objectives of the project

The objectives for this project are to:

- Develop step-by-step training documentation for WAS focusing on the generation of the WUEA report.
- Continue with the implementation and training of the Water Use Efficiency Accounting (WUEA) report in WAS at schemes that participated in the previous project and where additional training was required.
- Do a WAS training course through the Continuing Education department at the University of Pretoria (CE at UP).

Plan of action

Three different training methods are planned for this project which include:

- The development of step-by-step training documentation will be an ongoing process throughout the duration of this project. The training documentation will also be available on the WAS website at www.nbsystems.co.za.
- Training will be done onsite at the selected irrigation schemes. The training will be done much more intensively at a slower pace and where possible on a one-on-one basis.
- At least one WAS training course will be done during the duration of the project through the Continuing Education department at the University of Pretoria (CE at UP).

Training

A total of eight schemes were included as part of this project and all the training sessions at the different irrigation schemes are recorded. All training sessions were done at a slower pace as planned and, where possible, done on a one-on-one basis. The final test for success is whether a scheme can generate and submit a Water Use Efficiency Accounting Report (WUEAR) independently without any help.

The results have been excellent except for two of the eight schemes which include the Lower Sundays River WUA (LSRWUA) and Sandvet WUA. At LSRWUA the WAS is installed but not operational which made the use of the WUEAR therefore impossible. At Sandvet WUA the Water Use Efficiency Accounting Report (WUEAR) has been implemented successfully but problems have been experienced with the measuring of the inflow into the scheme. Demo runs of the WUEAR have been done successfully and the training has been completed so that management personnel will be able to generate the reports on their own. New measuring equipment has been installed and it should be operational early 2011.

Training course at CE at UP

A short-hands course on the implementation, operation and maintenance of the Water Administration System (WAS) was held over a period of two days at the Continuing Education department at the University of Pretoria (CE at UP).

The training course at CE at UP was successfully completed in June 2010. A total of 24 people attended the course that was held in a computer training laboratory at the University of Pretoria. The training facility was really up to standard and it was possible to demonstrate WAS from a central computer over a network where each student could follow on his/her own computer screen.

All the marketing and registrations were done by CE at UP. A brochure was compiled which was used to market the course. A brochure was also distributed to the Department of Water Affairs (DWA) regional offices, irrigation schemes and potential candidates by Mr. J. Fourie from DWA.

WAS online training documentation

The online step-by-step training documentation that was developed and put on the NB Systems website turned out to be a huge success and a number of compliments have been received. Lower Olifants WUA successfully used the step-by-step documentation on the web without additional training to setup and generate their WUEA reports. Further development and improvements will be made to the documentation on a continuous basis. The development of training video clips have also been investigated and will definitely be added as part of the WAS training suite on the Web in the near future.

Conclusions and recommendations

The step-by-step training documentation has proven to be successful, easy to use and it will definitely be expanded in the future. The implementation of the WUEA report has also shown that it is a straight-forward and simple procedure to generate a useful report on water losses on irrigation schemes.

Although there is a place for basic training of larger groups (10 and more), better results were obtained when focusing on intensive one-on-one training. A well trained individual on a scheme means a lot more on a scheme than a group of half trained people.

In summary it can be stated that the correct tools are available but the focus needs to be directed to:

- Implementation of water loss control through WAS;
- Selected personnel to do the job;
- Identifying and training of core individuals that can train other people;
- Measuring stations (specifically the inflows into the scheme);
- Updating the step-by-step training documentation continuously and adding video clips.

ACKNOWLEDGEMENTS

The Water Research Commission (WRC), since the successful development and implementation of the Water Administration System (WAS) on almost all the major irrigation schemes throughout South Africa can mainly be contributed to the on-going financial support from the WRC. This project on training material and documentation concludes research that has been done over a period of 25 years.

A special word of thanks to Dr GR Backeberg (Director: Water Utilisation in Agriculture, WRC) for his on-going encouragement and support over many years that assisted to make the WAS the success that it is today.

Irrigation scheme personnel, for their input and support to develop and implement the WAS successfully.

To my wife Helena, who is always there to support me in everything that I do.

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1. Introduction

The Directorate of Water Use Efficiency of the Department of Water Affairs (DWA) is tasked to improve agricultural water management guided by the Water Conservation and Water Demand Management strategy (WCWDM) in the agricultural sector. In the management of water loss control, one of the major responsibilities of the sub-directorate is water accounting and auditing. This function requires the sub-directorate (Water Use Efficiency) to report on water use on government irrigation schemes, indicating both beneficial and non-beneficial water uses, with the objectives of reducing the unaccounted-for water component. Another important responsibility of the sub-directorate is the training of water control officers to effectively deliver against their water management responsibilities.

At the end of 2008 a Water Use Efficiency and Accounting (WUEA) report was developed as part of the Water Administration System (WAS) through funding by DWA and project management by the Water Research Commission (WRC) This WUEA report was successfully implemented at thirteen irrigation schemes and training was done on the different schemes and at a number of workshops.

Experience from this project had shown that the newly developed WUEA report is easy to use and that everybody prefers the new report over the previous Excel-based report. To build on the successes of this project and to ensure that the WUEA report is actively being used in a sustainable manner, it was recommended that much more should be done in terms of training courses and training material. This follow-on project funded by the WRC, is an extension of the previous project and the main focus of this project is training and the development of training documentation.

The objectives of the project are listed in the next paragraph followed by information on the WAS, the plan of action, the deliverables and the budget of the project.

2. Objectives

The objectives for this project are to:

- Develop step-by-step training documentation for WAS focusing on the generation of the WUEA report.
- Continue with the implementation and training of the Water Use Efficiency Accounting (WUEA) report in WAS at schemes that participated in the previous project and where additional training was required.
- Do a WAS training course through the Continuing Education department at the University of Pretoria (CE at UP).

3. Water Administration System (WAS)

3.1 Purpose of the was program

The Water Administration System (WAS) is designed to be a water management tool for irrigation schemes, Water User Associations (WUA's), Catchment Management Agencies (CMA's) and water management offices that want to manage their water usage, water distribution and water accounts.

The main aim during the development of the WAS program was to minimize water losses for irrigation schemes that work on the demand system and that distribute water through canal networks. Currently the WAS program is in use at all the major irrigation schemes cross South Africa and it manages an irrigated area of more than 142 000 ha including 9 500 farmers. The main benefits of using the WAS program is:

- The minimizing of water distribution losses.
- The excellent management of water allocations and water usage per farmer.
- The management of date and time related flow data collected from electronic loggers or mechanical chart recorders.
- The availability of an extensive list of water reports on farm and scheme level.
- The increased productivity of scheme management personnel.
- An integrated debit accounting system that improves debit management.
- The improvement of the overall water administration management on irrigation schemes.

Table 1: Irrigation schemes where the WAS program is used

Irrigation Scheme	Area (ha)	Water allocation (m^3/ha)	Total allocation (m^3)	Abstraction points	Years in use
Impala Water Users Association	17,012	10,000	170,120,000	423	10
Gamtoos Irrigation Board	7,408	6,000	44,448,000	808	3
Groenland Irrigation Board	5,864	6,000	35,184,000	146	6
Hartbeespoort Irrigation Board	13,915	6,200	86,273,000	1,721	9
Hereford Irrigation Board	3,425	7,700	26,372,500	53	3
Korentte Vetteriver Irrigation Board	852	7,000	5,964,000	121	4
Lower Olifants River WUA	9,212	12,200	112,386,400	1,415	10
Loskop Irrigation Board	16,135	7,700	124,239,500	794	15
Groot Marico Government Water Scheme	2,523	5,300	13,371,900	309	5
Mooiriver Government Water Scheme	4,954	7,700	38,145,800	603	12
Orange Riet WUA	15,941	11,000	175,351,000	679	6
Sandvet Government Water Scheme	10,542	1,080	11,385,360	616	10
Vaalharts WUA	35,060	9,140	320,448,400	1,873	12
Totals	142,843		1,163,689,860	9,561	

The WAS database can handle any number of abstraction points and measuring stations on canal networks, pipelines and rivers.

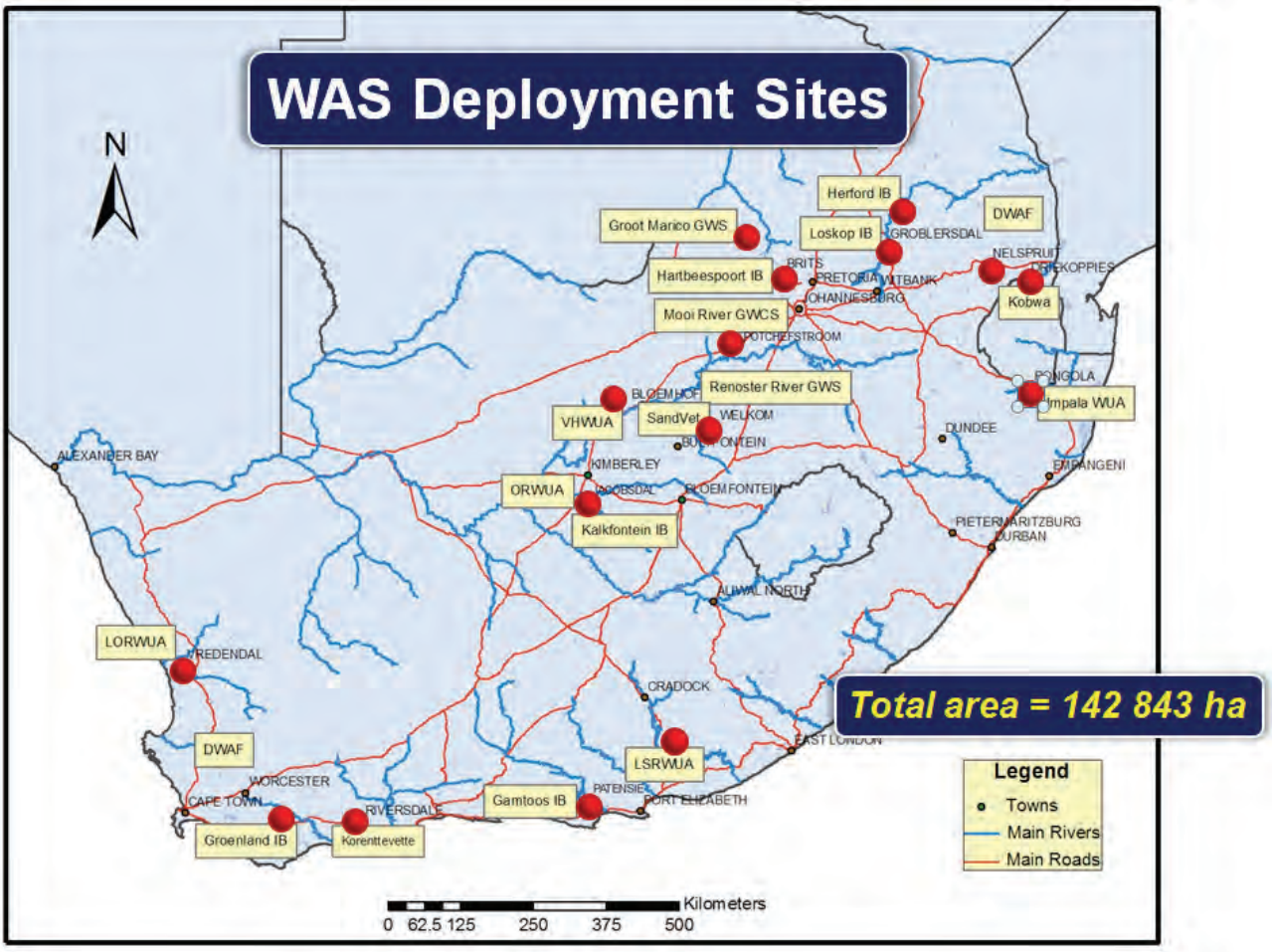


Figure 1 WAS Deployment Sites

3.2 Types of Application

WAS is an integrated database driven system with many water management capabilities. WAS can be implemented in a small water office that manages a few abstractions and measuring stations up to a CMA level that manages thousands of abstractions and measuring stations. WAS is used for the efficient administration of:

- Address information.
- Scheduled or ratable areas.
- Water allocations.
- Water delivered through pressure-regulated sluice gates, measuring structures and water meters.
- Water reporting including the WUEA report.
- Water transfers between users (Automatic and manually).
- Water use calculations for planted areas based on crop water use data.
- Date and time related flow data collected from electronic loggers or mechanical chart recorders.
- Discharge tables (DT) to do conversions between water depth and flow rate for measuring structures or vice versa.
- List of ratable areas (LRA) information.

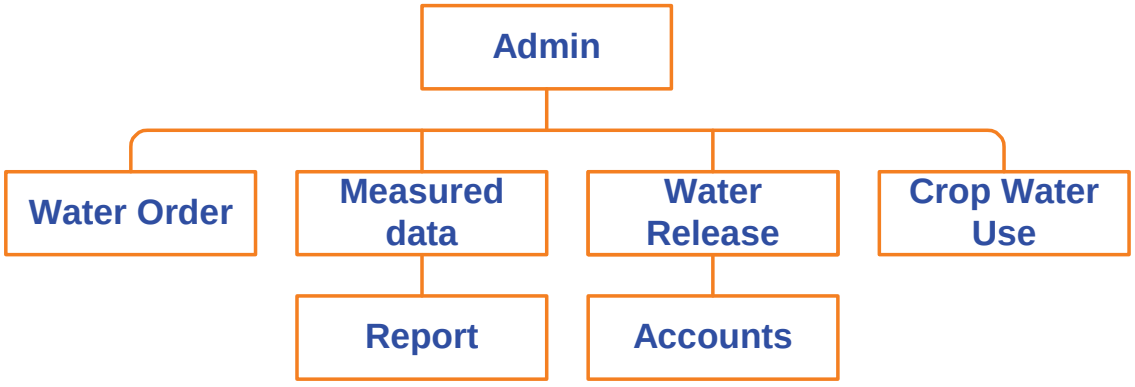
- Calculation of water releases for water distribution through canal networks, pipelines and rivers taking lag times, evaporation, transpiration and seepage into account.
- Billing system that links to the water usage information.
- E-mailing of invoices.
- Flexible user charges based on water usage, a flat rate or scheduled area.
- Images and photos that can be linked to different types of information in the database.

The WAS program saves all information in a Firebird database that can be installed on a single PC or on a server for use over a network. This makes it possible for the scheme manager, accounts personnel and water office personnel to access the database from PC's in their own offices. There is no limitation on the number of PC's that can be linked to the database.

What makes the WAS program unique is the fact that it is an integrated system that includes the water allocations, water use, water distribution and billing information. WAS will generate monthly invoices automatically using water usage or scheduled areas information captured in the database. Different user names and passwords can be used to control access to certain information in the database.

3.3 WAS modules

WAS consists of seven modules that are integrated into a single program that can be used on a single PC or a multi-user environment. These modules can be implemented partially or as a whole, depending on the requirements of the specific scheme or office. The seven modules are:



4. Plan of action

Three different training methods are planned for this project which includes:

- Develop step-by-step training documentation. The development of this documentation will be an ongoing process throughout the duration of the project. The training documentation will also be available on the WAS website at www.nbsystems.co.za/was.php.
- Training will be done onsite at the schemes listed in Table 2. The training will be done much more intensively at a slower pace and where possible one-on-one.
- At least one WAS training course will be done during the duration of the project through the Continuing Education department at the University of Pretoria (CE at UP).

5. Deliverables

The deliverables associated with this project are as follows.

(i) Development of step-by-step training documentation: R40 000 by 31 August 2009
(ii) Training given per training session at each individual scheme:
    a) Phase 1: R63 000 by 30 November 2009
    b) Phase 2: R56 000 by 28 February 2010
(iii) CE at UP training course: R21 000 by 30 April 2010
(iv) Final report: R20 000 by 30 June 2010.

6. WUEA report estimated training budget

The development and implementation of the WUEA report during the previous project was successful at all the participating schemes. The main problem at many of the schemes is the lack of trained personnel. The following table shows the estimated budget for onsite training for the participating schemes, the development of training documentation and giving a WAS course through CE at UP.

Table 2 Training budget for participating schemes

	Irrigation Scheme	Description	Estimated cost per visit (Excl)	No	Total
1	Sandvet GWS	Training	R 7 000.00	3	R 21 000.00
2	Lower Olifants River WUA	Training	R 13 000.00	2	R 26 000.00
3	Hartbeespoort IB	Training	R 3 500.00	2	R 7 000.00
4	Mooiriver GWS	Training	R 4 500.00	2	R 9 000.00
5	Groot Marico GWS	Training	R 4 500.00	2	R 9 000.00
6	Lower Sundays River WUA	Training	R 11 000.00	2	R 22 000.00
7	Njelele GWS	Training	R 8 000.00	3	R 24 000.00
8	Levubu GWS	Training	R 7 000.00	3	R 21 000.00
		Training documentation			R 40 000.00
		CE at UP course			R 21 000.00
	Total				**R 200 000.00**

7. Training

A total of eight schemes were included as part of this project and all the training sessions at the different schemes are shown in Table 1. All training sessions were done at a slower pace as planned and where possible done on a one-on-one basis. The final test for success is whether a scheme can generate and submit a Water Use Efficiency Accounting Report (WUEAR) independently without any help.

The results have been excellent except for two of the eight schemes which include the Lower Sundays River WUA (LSRWUA) and Sandvet WUA. At LSRWUA the WAS is installed but not operational which made the use of the WUEAR therefore impossible. At Sandvet WUA the Water Use Efficiency Accounting Report (WUEAR) has been implemented successfully but they have problems with the measuring of the inflow into the scheme. Demo runs of the WUEAR have been done successfully and the training has been completed so that they will be able to generate the

reports on their own. New measuring equipment has been installed and it should be operational early 2011.

Table 3 Training sessions completed

WUEA Report Training			
Scheme	Present	Date	WUEAR
Lower Olifants River WUA	Johan Matthee	19-Aug-09	Successful
	Cliff	4,5-Feb-10	
Sandvet WUA	Adel van der Merwe	5,6-Oct-09	Will be on line Jan 2010
	Marietjie Venter	23-Apr-10	
	Mothobe Vala	26-Oct-10	
	V.C. Amsterdam		
	W. Myburg		
	J. van der Walt		
	M.K. Mphlenyana		
	André		
	Sheila		
Hartbeespoort IB	Vaughan	08-Oct-09	Successful
	Annalien	12-Oct-10	
Groot Marico GWS	Martin Lamprecht	21-Oct-09	Successful
	Niklaas Plaatjies		
	Pieter du Toit		
Levuvhu & Njelele GWS	A. Padi	28-Oct-09	Successful
	J. Fourie	21,22-Jul-10	
	C. Lusenga		
	J.Maluleke		
	J. Moloto		
	W. Magidimisha		
	L.Padima		
Groot Marico GWS	Martin Lamprecht	10-Nov-09	Successful
	Niklaas Plaatjies	19-Oct-10	
	Pieter du Toit		
	Jannie Fourie		
Mooi River GWS	Chris du Plessis	24-Nov-09	Successful
	Japie	29-Nov-10	
Lower Sundays River WUA	H du Plessis	1-Feb-10	

7.1 Sandvet GWS

All training has been completed at Sandvet WUA and they are in a position to generate their WUEAR once they have sorted out the measuring stations issues at the inflow of the two main canals. Measuring station equipment has been installed and is operational. The only problem lies with the downloading of the data by means of a cable that are apparently missing at the moment.

A digitizing tablet has been installed at Sandvet to assist them with the processing of the data from chart recorders. Chart recorders are available at the inflow of the main canals, but they were unable to provide weekly release data to generate realistic WUEA reports.

Everything is ready at Sandvet at the moment except for the outstanding cable to download the data. They should be able to generate the WUEA reports by early 2011.

7.2 Lower Olifants River WUA

Lower Olifants River WUA (LORWUA) has a competent person who knows how to generate their WUEAR successfully. They have managed to setup and generate WUEA reports successfully by using the WAS step-by-step manual on the internet only. All the training sessions have been completed at LORWUA.

Figure 2 Lower Olifants River WUA offices

7.3 Hartbeespoort Irrigation Board

All the training sessions at Hartbeespoort irrigation board have been completed and they are currently generating their monthly WUEA reports successfully.

7.4 Mooiriver GWS

Mooi River GWS already generated and e-mailed the WUEAR successfully to Mr Fourie for the past couple of months. There is still one follow up training session available for them on this project.

7.5 Groot Marico GWS

Worth mentioning is that the newly appointed Pieter du Toit at Groot Marico GWS turned out to be an excellent WAS operator who managed to, not only, implement the WUEAR successfully, but also other modules of WAS as well. It is people like him that need to be identified and given more advanced training to build a strong WAS knowledgebase within DWA.

Figure 3 Measuring station: left bank main canal at Groot Marico

7.6 Lower Sundays River WUA

Lower Sundays River is the only scheme that did not receive any training as part of this project. Their WAS was however updated and the training will be done once they are ready to start using it.

Figure 4 Lower Sundays River Offices

7.7 Njelele & Levubu GWS

Special attention has been given to Njelele and Levuvhu GWS. Training has been given and both schemes already managed to send reports successfully to Mr Fourie at DWA head office. Their progress will however be monitored closely due to changes in personnel and getting the right person to operate the system.

Figure 5 Njelele offices

Table 4 Olifants River WUE 2009 WUEA report

Lower Olifants River WUA 2009														
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2009	Jan	11 153	895	0	152	0	0	12 200	16 690	4 490	26	42 423	88 137	33	68
2009	Feb	11 238	1 093	0	152	0	0	12 484	17 284	4 800	27	54 754	75 805	42	58
2009	Mar	11 884	1 139	0	190	0	0	13 214	20 888	7 674	36	67 778	62 782	52	48
2009	Apr	8 434	960	0	152	0	0	9 547	13 680	4 133	30	77 173	53 387	59	41
2009	May	5 666	617	0	190	0	0	6 473	8 573	2 100	24	83 455	47 104	64	36
2009	Jun	2 693	645	0	152	0	0	3 490	4 317	827	19	86 793	43 766	67	34
2009	Jul	2 826	684	0	152	0	0	3 662	4 116	454	11	90 303	40 256	69	31
2009	Aug	4 713	642	0	190	0	0	5 545	6 598	1 052	15	95 658	34 901	73	27
2009	Sep	7 817	171	0	152	0	0	8 141	10 411	2 270	21	103 647	26 913	79	21
2009	Oct	6 990	881	0	151	0	0	8 022	9 943	1 921	19	7 871	122 726	6	94
2009	Nov	11 263	967	0	189	0	0	12 419	17 504	5 086	29	20 101	110 496	15	85
2009	Dec	11 167	1 003	0	151	0	0	12 321	16 890	4 570	27	32 271	98 327	25	75
		95 844	**9 697**	**0**	**1 973**	**0**	**0**	**107 518**	**146 894**	**39 377**	**27**				

Table 5 Olifants River WUE 2010 WUEA report

Lower Olifants River WUA 2010															
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2010	Jan	14 546	1 152	0	189	0	0	15 887	21 246	5 359	25	47 969	82 628	37	63
2010	Feb	11 295	1 147	0	151	0	0	12 593	17 268	4 674	27	60 411	70 186	46	54
2010	Mar	9 480	1 062	0	151	0	0	10 693	15 151	4 458	29	70 953	59 644	54	46
2010	Apr	9 442	1 123	0	151	0	0	10 716	14 028	3 312	23	81 518	49 079	62	38
2010	May	4 047	637	0	189	0	0	4 872	5 670	798	14	86 202	44 396	66	34
2010	Jun	2 130	370	0	151	0	0	2 651	3 365	714	21	88 702	41 896	68	32
2010	Jul	3 938	757	0	151	0	0	4 845	7 270	2 424	33	93 396	37 201	72	29
2010	Aug	4 796	864	0	189	0	0	5 849	6 189	340	5	99 057	31 541	76	24
2010	Sep	8 452	265	0	151	0	0	8 868	11 277	2 409	21	107 773	22 824	83	18
2010	Oct	2 609	48	0	0	0	0	2 657	3 258	601	18	110 430	20 167	85	15
		70 735	**7 425**	**0**	**1 473**	**0**	**0**	**79 631**	**104 722**	**25 089**	**24**				

Table 6 Mooiriver GWS 2009 WUEA report

Mooiriver GWS 2009															
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2009	Jan	1 467	12	0	33	0	0	1 512	1 852	340	18	6 483	173 927	4	96
2009	Feb	283	5	0	33	0	0	321	405	84	20	6 771	173 638	4	96
2009	Mar	747	16	0	41	0	0	804	1 002	199	19	7 534	172 875	4	96
2009	Apr	577	19	0	33	0	0	629	765	137	17	8 146	172 263	5	96
2009	May	201	14	0	41	0	0	256	313	57	18	8 361	172 048	5	95
2009	Jun	223	6	0	33	0	0	262	319	57	17	8 633	171 776	5	95
2009	Jul	519	2	0	33	0	0	554	672	117	17	9 108	171 301	5	95
2009	Aug	1 095	20	0	41	0	0	1 155	1 390	235	16	10 222	170 187	6	94
2009	Sep	1 552	5	0	33	0	0	1 590	1 849	259	14	11 731	168 678	7	94
2009	Oct	1 766	19	0	33	0	0	1 818	2 186	368	16	1 785	178 624	1	99
2009	Nov	898	11	0	41	0	0	949	1 151	202	17	3 028	177 382	2	98
2009	Dec	1 102	11	0	33	0	0	1 145	1 349	204	15	4 045	176 364	2	98
		10 430	**140**	**0**	**428**	**0**	**0**	**10 995**	**13 253**	**2 259**	**17**				

Table 7 Mooiriver GWS 2010 WUEA report

Mooiriver GWS 2010															
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2010	Jan	902	7	0	33	0	0	942	1 109	167	15	4 954	175 455	3	97
2010	Feb	230	6	0	33	0	0	269	308	39	12	5 179	175 194	3	97
2010	Mar	837	10	0	33	0	0	880	1 055	175	16	6 275	174 099	4	97
2010	Apr	119	5	0	33	0	0	157	171	14	8	6 399	173 974	4	97
2010	May	137	1	0	41	0	0	179	213	34	15	6 509	173 865	4	96
2010	Jun	261	2	0	33	0	0	296	353	57	16	6 770	173 604	4	96
2010	Jul	335	2	0	33	0	0	369	430	61	14	7 156	173 218	4	96
2010	Aug	1 264	5	0	41	0	0	1 311	1 525	215	14	8 426	171 948	5	95
2010	Sep	1 458	9	0	33	0	0	1 500	1 790	290	16	9 839	170 530	6	95
2010	Oct	2 078	12	0	33	0	0	2 123	2 467	345	13	2 079	178 356	1	99
		7 621	**59**	**0**	**346**	**0**	**0**	**8 026**	**9 421**	**1 397**	**15**				

Table 8 Njelele GWS 2009 WUEA report

Njelele GWS 2009															
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2009	Apr	1 314	0	0	0	0	0	1 314	2 078	764	36	1 002	16 509	6	94
2009	May	1 370	0	0	0	0	0	1 370	2 428	1 058	43	2 498	15 013	14	86
2009	Jun	1 037	0	0	0	0	0	1 037	1 716	679	39	3 329	14 182	19	81
2009	Jul	968	0	0	0	0	0	968	1 498	530	35	4 293	13 218	25	76
2009	Aug	1 631	0	0	0	0	0	1 631	2 062	431	20	5 778	11 734	33	67
2009	Sep	1 552	0	0	0	0	0	1 552	2 042	491	24	7 320	10 191	42	58
2009	Oct	2 261	0	0	0	0	0	2 261	2 963	702	23	9 052	8 460	52	48
2009	Nov	716	0	0	0	0	0	716	928	212	22	10 525	6 986	60	40
2009	Dec	1 311	0	0	0	0	0	1 311	1 864	553	29	11 209	6 303	64	36
		12 160	**0**	**0**	**0**	**0**	**0**	**12 160**	**17 579**	**5 420**	**31**				

Table 9 Levubu GWS 2009 & 2010 WUEA report

Levubu GWS 2009														
Year	Mnth	Agriculture	Industrial	Municipality	Household	Downstream	Other	Total	Released	Loss	% Loss	Used	Avail	% Used	% Avail
		($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)		($x10^3$ m^3)	($x10^3$ m^3)		
2009	Apr	174	0	0	0	0	0	174	286	113	39	174	5 902	3	97
2009	May	259	0	0	0	0	0	259	482	223	46	433	5 643	7	93
2009	Jun	199	0	0	0	0	0	199	355	156	43	632	5 443	10	90
2009	Jul	240	0	0	0	0	0	240	384	144	37	872	5 203	14	86
2009	Aug	351	0	0	0	0	0	351	520	169	32	1 223	4 853	20	80
2009	Sep	317	0	0	0	0	0	317	471	154	32	1 539	4 536	25	75
2009	Oct	307	0	0	0	0	0	307	507	201	39	1 846	4 229	30	70
2009	Nov	264	0	0	0	0	0	264	416	152	36	2 110	3 965	35	65
2009	Dec	97	0	0	0	0	0	97	169	72	42	2 208	3 868	36	64
		2 208	**0**	**0**	**0**	**0**	**0**	**2 208**	**3 590**	**1 384**	**38**				

Levubu GWS 2010														
Year	Mnth	Agriculture	Industrial	Municipality	Household	Downstream	Other	Total	Released	Loss	% Loss	Used	Avail	% Used	% Avail
		($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)		($x10^3$ m^3)	($x10^3$ m^3)		
2010	Apr	44	0	0	0	0	0	44	64	20	31	44	20 207	0	100
2010	May	100	0	0	0	0	0	100	150	50	33	144	20 107	1	99
2010	Jun	156	0	0	0	0	0	156	224	69	30	300	19 951	2	99
2010	Jul	180	0	0	0	0	0	180	279	99	35	480	19 771	2	98
2010	Aug	238	0	0	0	0	0	238	361	124	34	717	19 534	4	97
		718	**0**	**0**	**0**	**0**	**0**	**718**	**1 078**	**362**	**33**				

Table 10 Hartbeespoort Irrigation Board: Eastern Canal 2009 & 2010 WUEA report

Hartbeespoort Irrigation Board: Eastern Canal 2009														
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2009	Oct	4 253	0	0	9	0	0	4 262	8 814	4 552	51	668	7 378	8	92
2009	Nov	2 650	648	0	11	0	0	3 310	6 970	3 660	52	1 444	6 601	18	82
2009	Dec	735	0	0	7	0	0	742	2 617	1 874	71	1 913	6 132	24	76
		7 638	**648**	**0**	**27**	**0**	**0**	**8 314**	**18 401**	**10 086**	**55**				

Hartbeespoort Irrigation Board: Eastern Canal 2010														
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2010	Jan	701	203	0	9	0	0	911	2 480	1 569	63	2 206	5 839	27	73
2010	Feb	2 607	268	0	9	0	0	2 884	6 654	3 770	56	2 722	5 323	34	66
2010	Mar	3 091	0	0	9	0	0	3 100	7 402	4 303	58	3 284	4 761	41	59
2010	Apr	718	391	0	9	0	0	1 118	2 712	1 594	58	3 486	4 560	43	57
2010	May	469	505	0	11	0	0	985	1 800	816	45	3 612	4 433	45	55
2010	Jun	1 846	0	0	9	0	0	1 854	4 731	2 877	60	3 971	4 074	49	51
2010	Jul	2 228	307	0	8	0	0	2 543	5 456	2 912	53	4 380	3 665	54	46
2010	Aug	3 447	330	0	10	0	0	3 787	9 304	5 517	59	5 026	3 019	63	38
2010	Sep	4 032	386	0	8	0	0	4 427	9 355	4 928	52	6 051	1 995	75	25
		19 139	**2 390**	**0**	**82**	**0**	**0**	**21 609**	**49 894**	**28 286**	**57**				

Table 11 Hartbeespoort Irrigation Board: Western Canal 2009 & 2010 WUEA report

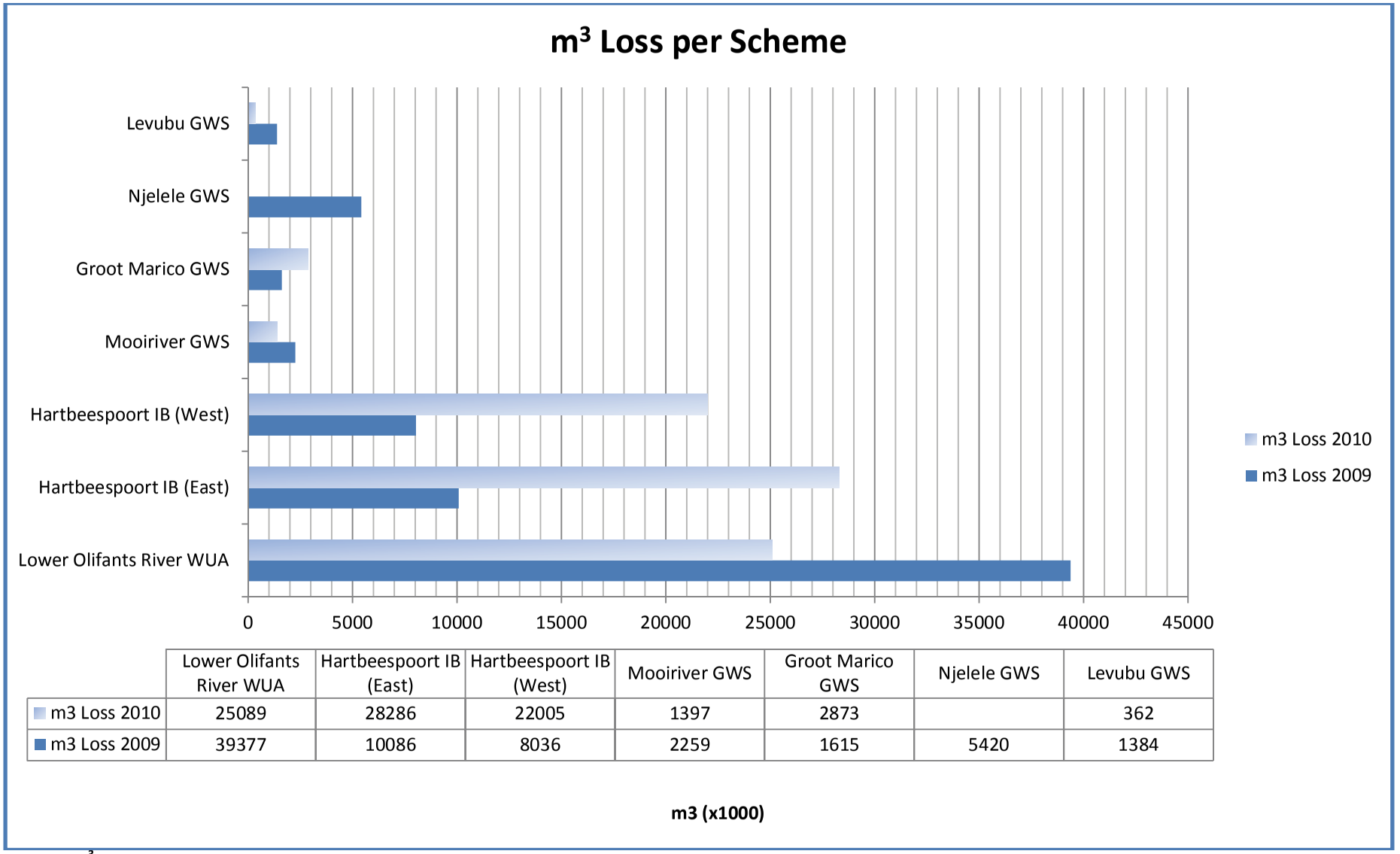
Hartbeespoort Irrigation Board: Western Canal 2009															
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)		($x10^3$ m^3)	($x10^3$ m^3)		
2009	Oct	4 021	0	0	5	0	0	4 026	8 455	4 429	52	286	15 366	2	98
2009	Nov	2 269	69	0	7	0	0	2 345	5 376	3 030	56	1 184	14 468	8	92
2009	Dec	282	0	0	4	0	0	286	863	577	66	1 628	14 023	10	90
		6 572	**69**	**0**	**16**	**0**	**0**	**6 657**	**14 694**	**8 036**	**55**				

Hartbeespoort Irrigation Board: Western Canal 2010															
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)	($x10^3$ m^3)		($x10^3$ m^3)	($x10^3$ m^3)		
2010	Jan	125	99	0	5	0	0	229	948	719	75	2 116	13 535	14	87
2010	Feb	2 773	143	0	5	0	0	2 921	5 640	2 720	48	3 129	12 523	20	80
2010	Mar	3 508	0	0	5	0	0	3 513	6 715	3 202	47	4 282	11 370	27	73
2010	Apr	513	181	0	5	0	0	699	1 836	1 136	61	4 691	10 961	30	70
2010	May	607	236	0	7	0	0	850	1 590	740	46	5 300	10 351	34	66
2010	Jun	2 538	0	0	5	0	0	2 544	4 984	2 440	48	6 134	9 517	39	61
2010	Jul	2 372	206	0	5	0	0	2 583	4 504	1 922	42	7 088	8 563	45	55
2010	Aug	4 011	135	0	7	0	0	4 153	9 396	5 243	55	8 478	7 173	54	46
2010	Sep	5 477	206	0	5	0	0	5 689	9 572	3 883	40	10 464	5 188	67	33
		21 924	**1 206**	**0**	**49**	**0**	**0**	**23 181**	**45 185**	**22 005**	**49**				

Table 12 Groot Marico GWS 2009 WUEA report

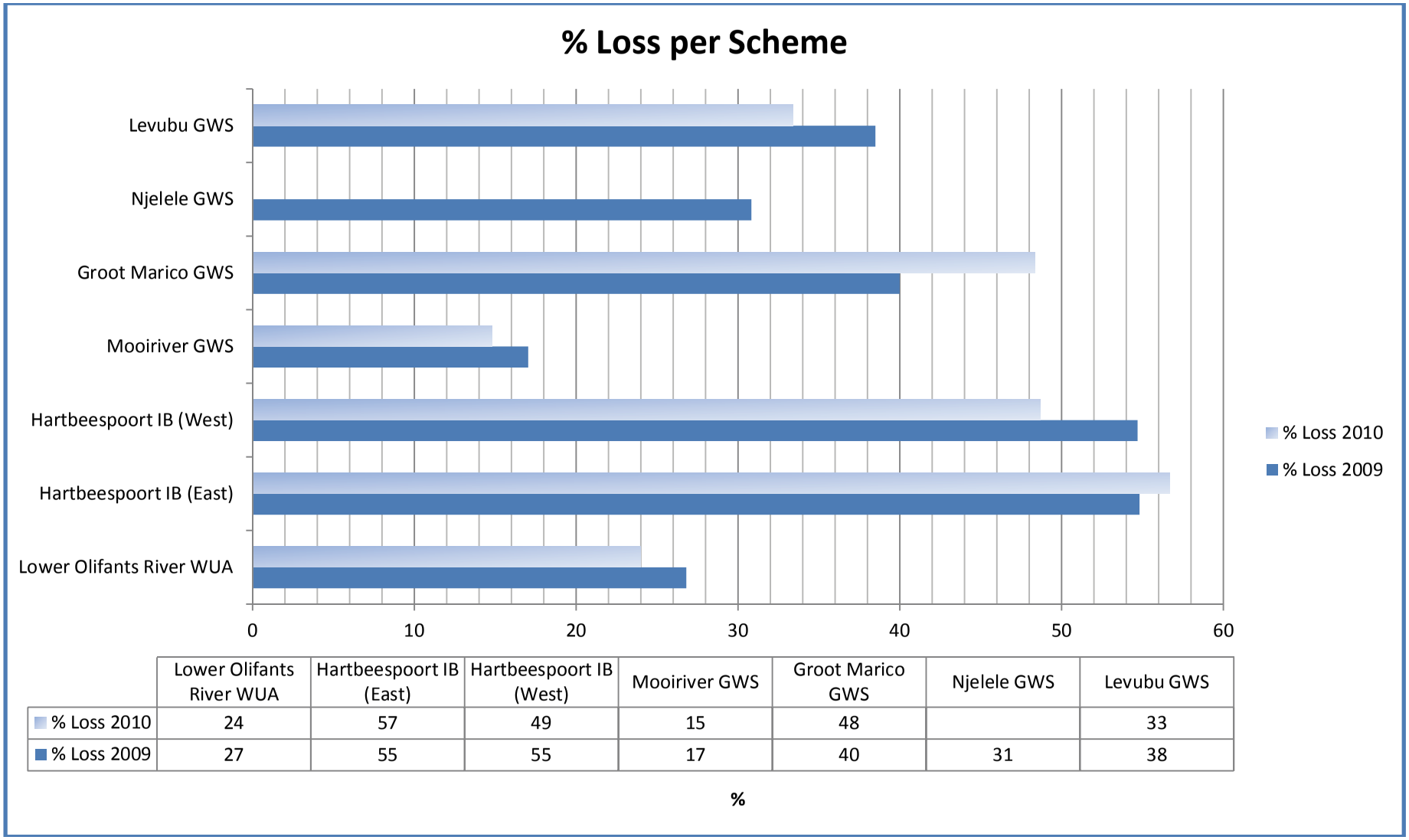
Groot Marico GWS 2009															
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2009	Nov	1 160	0	0	16	0	0	1 177	2 052	875	42	1 647	11 727	12	88
2009	Dec	1 233	0	0	13	0	0	1 246	1 986	740	37	2 880	10 494	22	79
		2 393	**0**	**0**	**29**	**0**	**0**	**2 423**	**4 038**	**1 615**	**40**				

Groot Marico 2010															
Year	**Mnth**	**Agriculture**	**Industrial**	**Municipality**	**Household**	**Downstream**	**Other**	**Total**	**Released**	**Loss**	**% Loss**	**Used**	**Avail**	**% Used**	**% Avail**
		($x10^3$ m^3)	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**	**($x10^3$ m^3)**		**($x10^3$ m^3)**	**($x10^3$ m^3)**		
2010	Jan	572	0	0	16	0	0	588	1 104	516	46	3 452	9 922	26	74
2010	Feb	1 074	0	0	13	0	0	1 087	2 180	1 093	50	4 526	8 848	34	66
2010	Mar	1 144	0	0	13	0	0	1 157	2 259	1 102	48	5 670	7 704	42	58
2010	Apr	143	0	0	13	0	0	156	300	144	48	5 813	7 561	44	57
2010	May	66	0	0	16	0	0	82	100	18	18	5 878	7 496	44	56
		2 999	**0**	**0**	**71**	**0**	**0**	**3 070**	**5 943**	**2 873**	**48**				



	Lower Olifants River WUA	Hartbeespoort IB (East)	Hartbeespoort IB (West)	Mooiriver GWS	Groot Marico GWS	Njelele GWS	Levubu GWS
m3 Loss 2010	25089	28286	22005	1397	2873		362
m3 Loss 2009	39377	10086	8036	2259	1615	5420	1384

Figure 6 m^3 Loss per Scheme



	Lower Olifants River WUA	Hartbeespoort IB (East)	Hartbeespoort IB (West)	Mooiriver GWS	Groot Marico GWS	Njelele GWS	Levubu GWS
% Loss 2010	24	57	49	15	48		33
% Loss 2009	27	55	55	17	40	31	38

Figure 7 % Loss per Scheme

8. Web based training documentation

The step-by-step training documentation on the NB Systems website turned out to be a huge success and a number of compliments have been received so far. Special mentioning should be made about Lower Olifants WUA where they successfully used the step-by-step documentation on the web without additional training to setup and generate their WUEA reports. The core documentation to generate WUEA reports with WAS has been completed and is available on the website. Further development and improvements will be made on a continuous basis. The development of training video clips have also been investigated and will definitely be added as part of the WAS training suite on the Web in the near future.

9. Training at CE at UP

A short hands on course on the implementation, operation and maintenance of the Water Administration System (WAS) was held over a period of two days at the Continuing Education department at the University of Pretoria (CE at UP).

The training course at CE at UP was successfully completed on the 23rd and 24th of June 2010 and detailed feedback on the course is attached. A total of 24 people attended the course that was held in a computer training laboratory at the University of Pretoria. The training facility was really up to standard and it was possible to demonstrate WAS from a central computer over a network where each student could follow on his/her own computer screen.

All the marketing and registrations were done by CE at UP. A brochure was compiled by them which were used to market the course. Mr. J. Fourie from the Department of Water Affairs (DWA) also distributed the brochure to their regional offices, irrigation schemes and potential candidates.

LIST OF ATTENDEES Short Course on the Implementation, Operation and Maintenance of WAS			
Name	City	e-mail	Cell
Petrus Johannes Beyleveld	Hartbeespoort	beylevj@dwaf.gov.za	828 075 383
Nobubele Boniwe	Pretoria	boniwen@dwa.gov.za	833 140 514
Joseph Cocks	Hartbeespoort		829 015 330
Pieter Machiel du Toit	Hartbeespoort		829 078 268
Marius Francois Hendriks	Groblersdal	hendrim@dwaf.gov.za	828 031 886
Andries Labuscagne	Welkom	alabuscagne@sandvet.co.za	788 005 045
Martin Louis Lamprecht	Hartbeespoort	lamprem@dwaf.gov.za	828 004 557
Neo Vincent Leburu	Pretoria	leburun@dwa.gov.za	829 584 494
Christopher Petrus Lusenga	Tzaneen	chrislusenga@vodamail.co.za	823 216 700
William Fredereck Matsabe	Lydenburg	matsabw@dwaf.gov.za	828 023 447
Unathi Mila	Pretoria	milau@dwa.gov.za	849 830 791
Cosmas Qinisela Mnguni	Pretoria	mngunic@dwa.gov.za	735 029 024
Phiki Amos Molalasi	Hartbeespoort		828 870 627
Livhuwani Mutobvu	Tzaneen		823 205 903
Willie Myburgh	Welkom	wmyburgh@mtn.blackberry.com	788 003 546

Eunice Sibongile Nkosi	White River		828 707 170
Elizabeth Jacoba Oosthuizen	Vanderkloof	oosthuizene@dwaf.gov.za	828 097 043
Andries Maubane Padi	Pretoria	padia@dwaf.gov.za	828 065 448
Niklaas Plaatjies	Hartbeespoort		828 020 541
Mosotho Jane Qhaki	Groblersdal	qhakij@dwa.gov.za	829 410 877
Nhlamulo Rita Shiluvana	Pretoria	shiluvanan@dwa.gov.za	723 347 935
Vukani Nobleman Tshabalala	Pretoria	tshabalalav@dwa.gov.za	838 628 063
André van der Merwe	Welkom		828 874 330
Lourens Serfontein van Niekerk	Hartbeespoort	vanniekerkl@dwa.gov.za	828 881 229

The WAS course was done hands on with each participant using his/her own computer. The course mainly focused on the entry to mid-level WAS operator.

The feeling of most of the current WAS operators is that there should be an advance course available to candidates that have reached a certain skill level. Beginners tend to down grade the course standard and it is therefore important to separate the advanced WAS operators from the beginners to get the most out of a course.

The feedback was all positive except for the concern that the course covered too much information in a short space of time. The current thinking is to keep the course content as it is and then do advance training on site and address scheme specific issues.

10. Course Information on the CE at UP website

The following is the information on the WAS course which is available on the CE at UP website (http://scarlacc.up.ac.za/CEatUP/):

Short Course on the Implementation, Operation and Maintenance of WAS:

Number: P001951
Catalogue Category: Natural Sciences
Catalogue Sub-Category: Environment Management

Brief Description:
This course is designed to give participants an understanding of the practical application of the Water Administration System (WAS) to enhance water distribution management skills. It will also provide the participant with the tools to increase productivity and save water. This course is aimed at individuals from irrigation boards, government water schemes, water user associations and all regions of the Department of Water Affairs.

The Water Administration System (WAS) is designed to be a management tool for irrigation schemes, Water User Associations (WUA's), Catchment Management Agencies (CMA's) and water management offices that want to manage their water usage, water distribution and measuring stations.

Learning Outcomes:

Successful completion of the course will:

- Allow a water control officer to use WAS for efficient water distribution management on a water scheme.
- Enable database administrators to install, administrate and maintain the WAS database.
- Equip scheme managers to generate useful water distribution management reports.

Course Content:

- Overview of WAS
- WAS interface
- Administration module
- Water order module
- Measured data module
- Water release module
- Crop water use module
- Report module
- Installation
- Data base administration
- Data base maintenance

Who Should Attend:

- Water control officers using WAS or wanting to use WAS.
- Irrigation scheme managers where WAS is already implemented or where it is planned to be implemented.
- Database administrators who will be responsible to install, administrate and maintain the WAS database.

Entry requirements: None
Other Entry Requirements: None
Assessment Type: Assignment(s)

E-mail address: info.ce@up.ac.za
Telephone number: +27(0) 12 420 5015/5051
Fax number: +27 (0) 866 359 219
Website: www.ceatup.com or www.ceatup.co.za

11. WAS: Short Course Evaluation

EVENT TITLE: Short Course on the Implementation, Operation and Maintenance of WAS

2010/07/21
11:10:37

Event Number: P001951-01-2010
Event Start Date: **2010/06/23**

Number of Evaluations: 22

Genders:

NOT	1
FEMALE	5
MALE	16

Course Leader: **Nico Benade**

Event Coordinator: **Nadia Noome**

Age Group

	1
21-30	7
31-40	6
41-50	5
50+	3

PART 1 Questions related to the COURSE ENVIRONMENT	Average
1. Accessibility and parking	3.95
2. Cleanliness	4.62
3. Learning environment	4.41
4. Comfort & convenience	4.29
5. Safety & security	4.62
Average :	**4.37**

-5 = Worse than Expected, 5 = Better Than Expected

PART 2 Questions related to COURSE CONTENT	Average
1. Relevant	4.27
2. Appropriate	4.27
3. Fresh/up-to-date	4.38
4. Thought provoking	4.00
5. Practical/applicable	4.65
6. Difficult and confusing	3.38
7. As advertised or promoted	4.19
8. Important information	4.48
9. Stimulated student participation	4.24
10. I learnt something I didn't know before	4.59
11. It was structured logically and clearly	4.23
12. Aligned to my level of skill and experience	4.05
13. Tried to cover too much in too little time	3.20
14. I can apply what I learnt in my current job	3.86
Average :	**4.13**

-5 = I disagree, 5 = I agree

PART 3 Questions related to the PRESENTATION of the course content	Average
1. Encouraged student participation	4.27
2. Professional presentation	4.57
3. Effective use of multimedia	4.50
4. Colourful and stimulating presentation	4.18
5. Technology used supported the content	4.32
6. Good presentation skills	4.29
Average :	**4.35**

-5 = I disagree, 5 = I agree

PART 4 Questions related to the LECTURE NOTES OR COURSE MATERIALS provided	Average
1. Neat and well presented	4.32
2. Logically structured and easy to follow	3.50
3. Good reference source for future use	4.24
4. Supported the course content	4.18
5. Fair and manageable workload	3.90
Average :	**4.03**

-5 = I disagree, 5 = I agree

PART 5 The following deal specifically with matters relating to CATERING	Average
1. Quality of the food (lunch)	4.00
2. Presentation of lunch	3.86
3. Day-to-day variety & appeal	3.91
4. Value for money	4.00
5. Service quality	3.91
6. Refreshments other than lunch	3.77
Average :	**3.91**

-5 = Worse than expected, 5 = Better than expected

PART 6 OVERALL SATISFACTION RATINGS	Average
Excellent / Poor	4.24
High quality / Low quality	4.30
High standards / Low Standards	4.35
One of the best / One of the worst	4.20
Superior / Inferior	4.05
What is the probability that you would attend a course like this at the University again in future?	4.45
What is the likelihood that you would recommend such a course to a friend or colleague?	4.52
Thinking of your most recent course experience at the University please rate and express your personal overall level of satisfaction.	4.14
Average :	**4.28**

-5 = Very Low/Unlikely/Poor, 5 = Very High/Likely/Excellent

Lecturer Mr Nico Benade

1.	Engaging and interesting	4.32
2.	Well prepared and confident	4.55
3.	Knowledgable about the subject	4.82
4.	Generally a good teacher	4.59
5.	Used good practical examples	4.68
6.	Presented at a realistic pace	4.36
7.	Encouraged participation	4.36
8.	Enthusiastic and creative	4.50
9.	Able to explain abstract concepts	4.41
10.	Used language I could understand	4.64
11.	The degree of care that went into the preparation	4.76
12.	The enthusiasm with which it was presented	4.50
13.	The measure of success in transferring knowledge	4.45
14.	The degree of rapport with the class as a whole	4.41
15.	The lecturer's ability to make material practically relevant	4.59
	Average :	**4.53**

12. WAS: Course Brochure

CONTINUING EDUCATION
UNIVERSITY OF PRETORIA

Tel: +27(0) 12 420 5015
Fax: +27(0) 12 420 5465
E-mail: data.ce@up.ac.za
Graduate Centre, Main Campus
University of Pretoria
www.ceatup.com

Course Brochure

Short Course on the Implementation, Operation and Maintenance of the Water Administration System (WAS) Presented by the Department of Plant Production and Soil Science

23-24 June

BRIEF DESCRIPTION

This course is designed to give participants an understanding of the practical application of the Water Administration System (WAS) to enhance water distribution management skills. It will also provide the participant with the tools to increase productivity and save water. This course is aimed at individuals from irrigation boards, government water schemes, water user associations and all regions of the Department of Water Affairs.

The Water Administration System (WAS) has been designed to be a management tool for irrigation schemes, Water User Associations (WUA's), Catchment Management Agencies (CMA's) and water management offices that want to manage their water usage, water distribution and measuring stations.

LEARNING OUTCOMES

Successful completion of the course will:

- allow a water control officer to use WAS for efficient water distribution management on a water scheme;
- enable data base administrators to install, administrate and maintain the WAS database; and
- equip scheme managers to generate useful water distribution management reports.

OUTLINE OF COURSE CONTENT

The WAS development and training documentation was done mainly with Water Research Commission funding:

- Overview of WAS
- WAS interface
- Admin module
- Water order module
- Measured data module
- Water release module
- Crop water use module
- Report module
- Installation
- Data base administration
- Data base maintenance

WATER RESEARCH COMMISSION

WHO SHOULD ATTEND?

The course is beneficial to people from Irrigation Boards, Government Water Schemes, Water User Associations and the Department of Water Affairs (including all regions).

COURSE STRUCTURE

The course will be presented over 2 days.

COURSE FEE (CE at UP IS EXEMPT FROM VAT)

The course fee is R 2 800 per person and covers all course material, lunch and refreshments on campus.

ACCREDITATION

2 credits on a NQF level 5.

COURSE CONTENT ENQUIRIES

Dr Nico Benade
Tel: +27 (0)12 548 1005
E-mail: nicob@mweb.co.za

REGISTRATION & ENQUIRIES

Client Service Centre
Tel: +27 (0)12 420 5015
Fax: +27 (0)12 420 5465
E-mail: info.ce@up.ac.za
www.ceatup.com

Further Your Future With Us

13. WAS: Course contents

Water Administration System (WAS)
Short Course
CE@UP (23 & 24 June 2010)

Acknowledgment: The development of the Step-by-step documentation was funded by the Water Research Commission

Wednesday 23 June 2010

07:30 – 08:00	Registration
08:00 – 08:10	Welcome
08:15 – 09:00	Overview of WAS (presentation)
09:00 – 10:00	Install, start and register WAS
10:00 – 10:30	Tea
10:30 – 12:30	Session 1 (hands on)
12:30 – 13:30	Lunch
13:30 – 15:00	Session 2 (hands on)
15:00 – 15:15	Tea
15:15 – 16:00	Session 3 (hands on)

Thursday 24 June 2010

08:00 – 08:30	Revision of previous day (discussion)
08:30 – 10:00	Session 4 (hands on)
10:00 – 10:30	Tea
10:30 – 12:30	Session 5 (hands on)
12:30 – 13:30	Lunch
13:30 – 15:00	Session 6 (hands on)
15:00 – 15:15	Tea
15:15 – 16:00	Evaluation & Closing

14. Conclusions and recommendations

The step-by-step training documentation has proven to be successful and really easy to use and it will definitely be expanded in the future. The implementation of the WUEA report has also shown that it is a straight forward and simple procedure to generate a useful report on water losses on irrigation schemes.

Although there is a place for basic training of larger groups (10 and more), better results were obtained when focusing on intensive one-on-one training. A well trained individual on a scheme means a lot more on a scheme than a group of half trained people.

In summary it can be stated that the correct tools are available but the focus needs to be directed to:

- Implementation of water loss control through WAS;
- Correctly selected personnel to do the job;
- Identifying and training of core individuals that can train other people;
- Measuring stations (specifically the inflows into the scheme);
- Updating the step-by-step training documentation continuously and adding video clips.

15. WAS: Online documentation

A comprehensive step-by-step manual of the WAS is available on the NB Systems website at the link www.nbsystems.co.za. There are cross reference links on every page which are used to explain subject matter in more detail or to jump to relevant information easily. The following printed information doesn't do any justice to the online documentation because of the cross reference links that's not available.

The online documentation will be expanded and updated continuously and features like video clips will also be added in the near future. The main aim of the online documentation is to develop it in a way that virtually no support is needed to install, run and maintain the WAS.

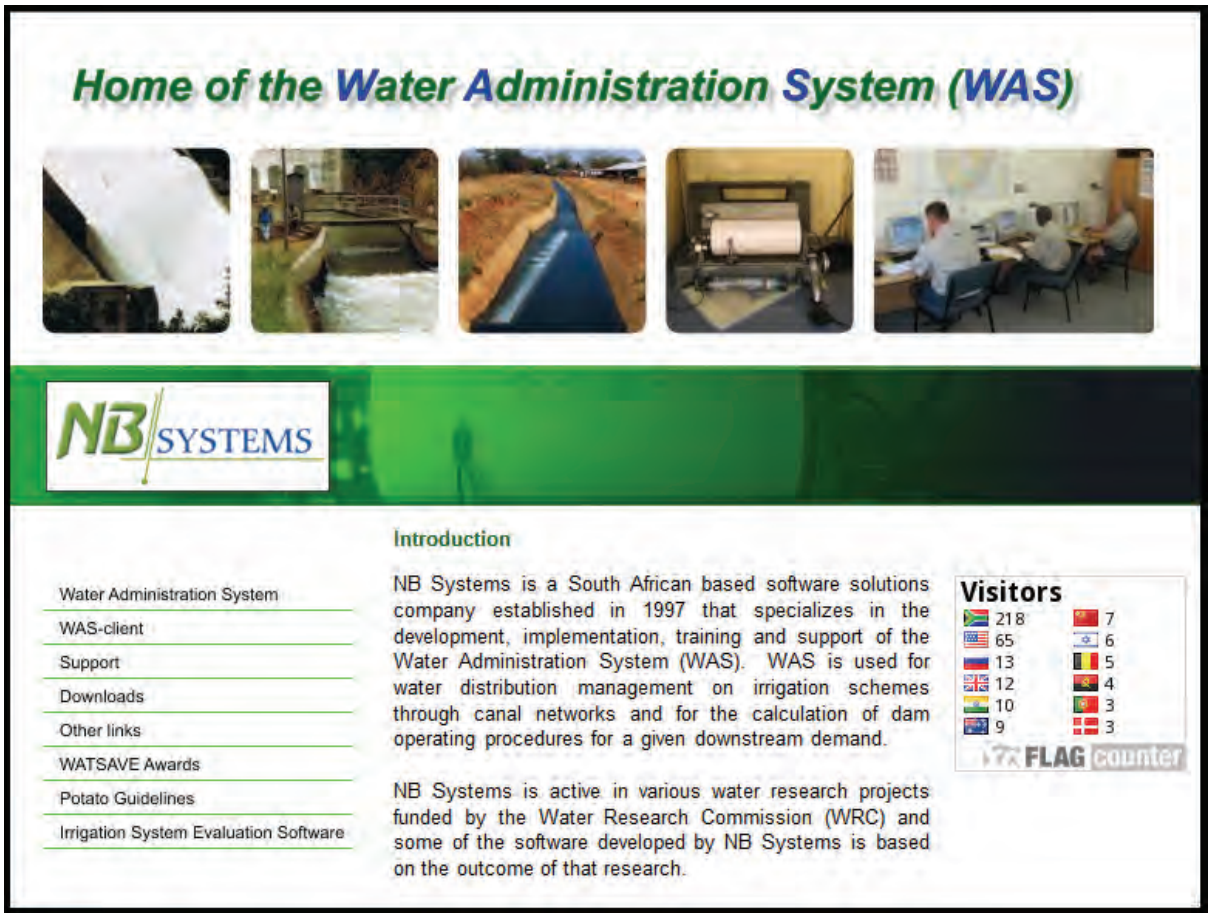


Figure 8 Access to WAS online manual through the NB Systems' website

Figure 9 WAS on line documentation contents

Figure 10 Introduction p1

Figure 11 Introduction p2

Figure 12 Introduction p3

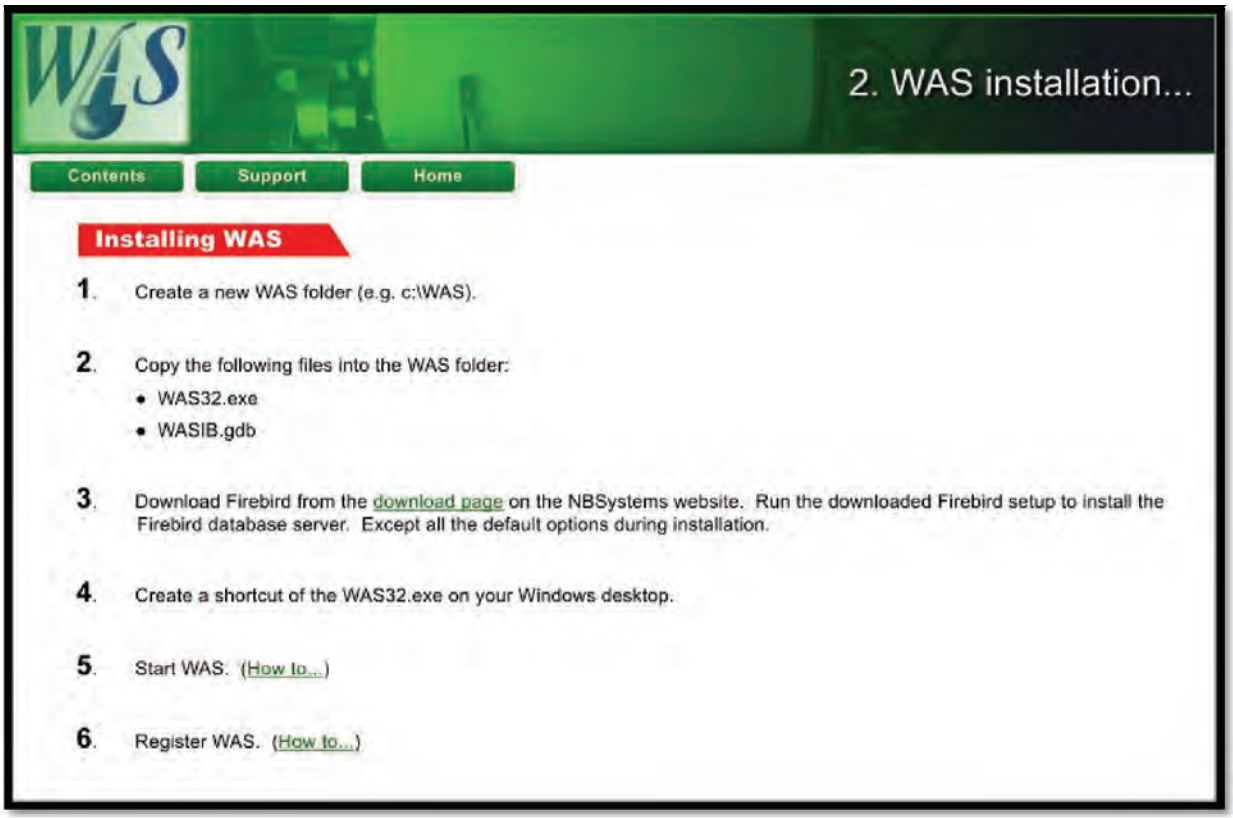


Figure 13 WAS installation

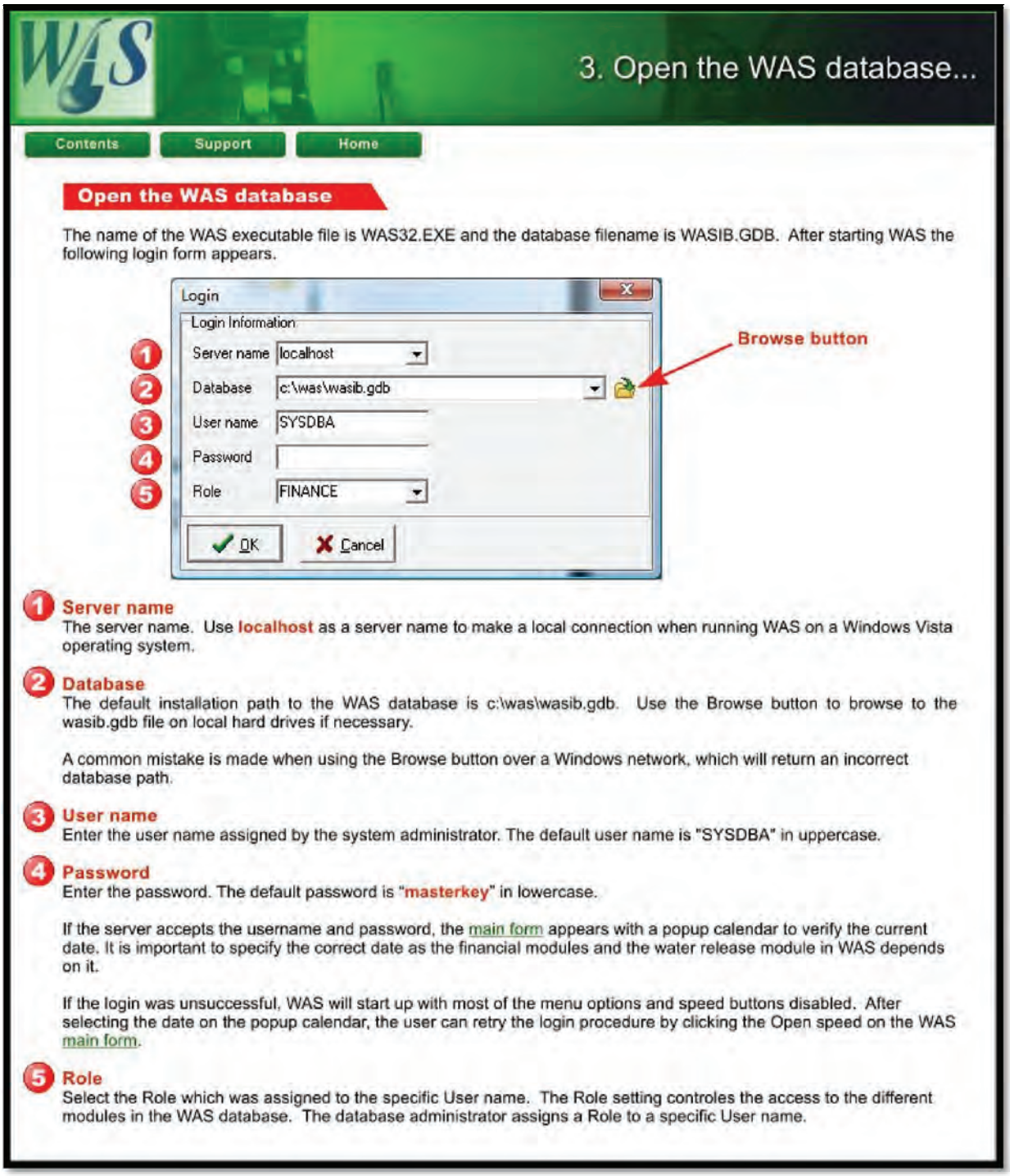


Figure 14 Open the WAS database

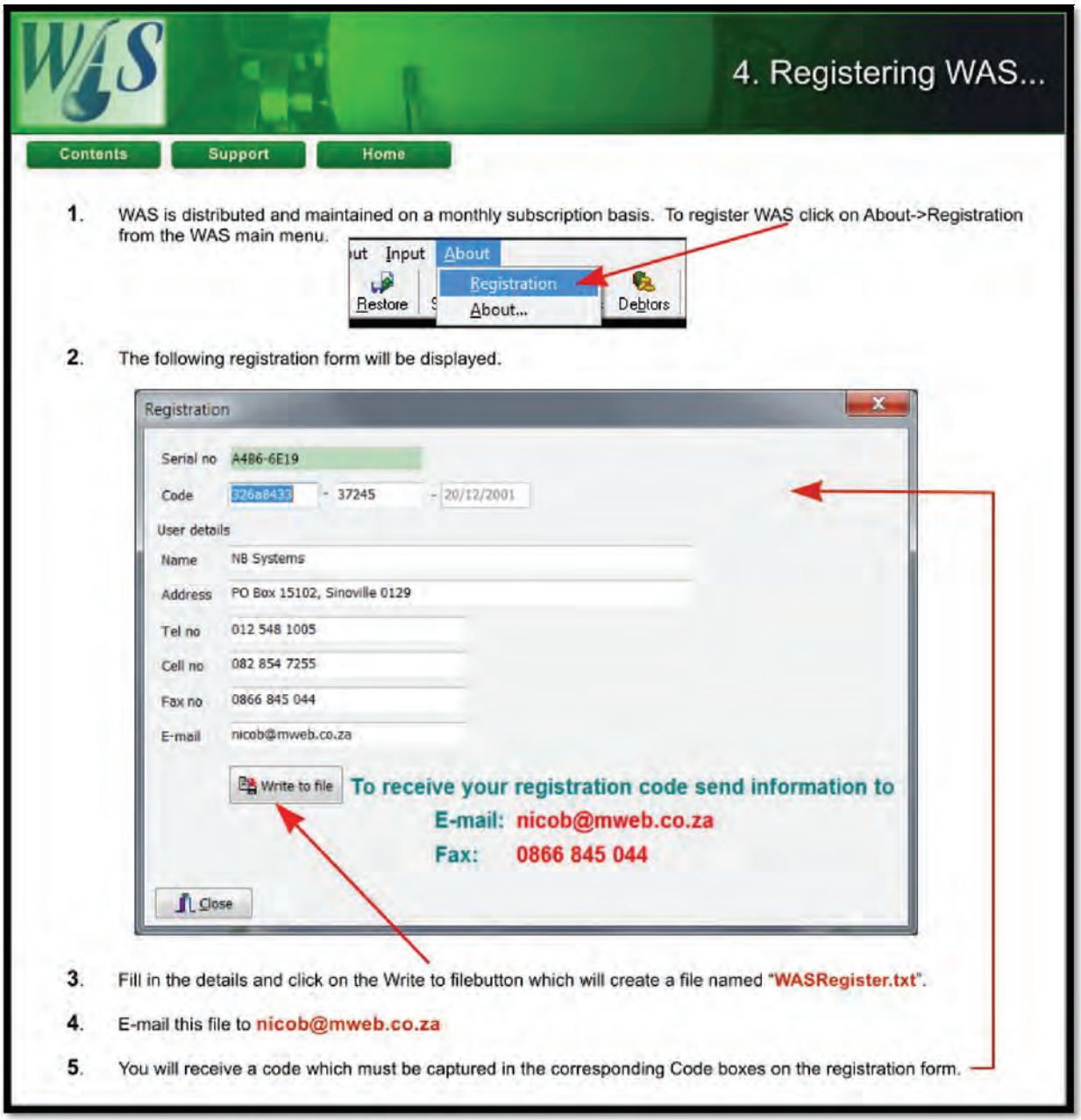


Figure 15 Registering WAS

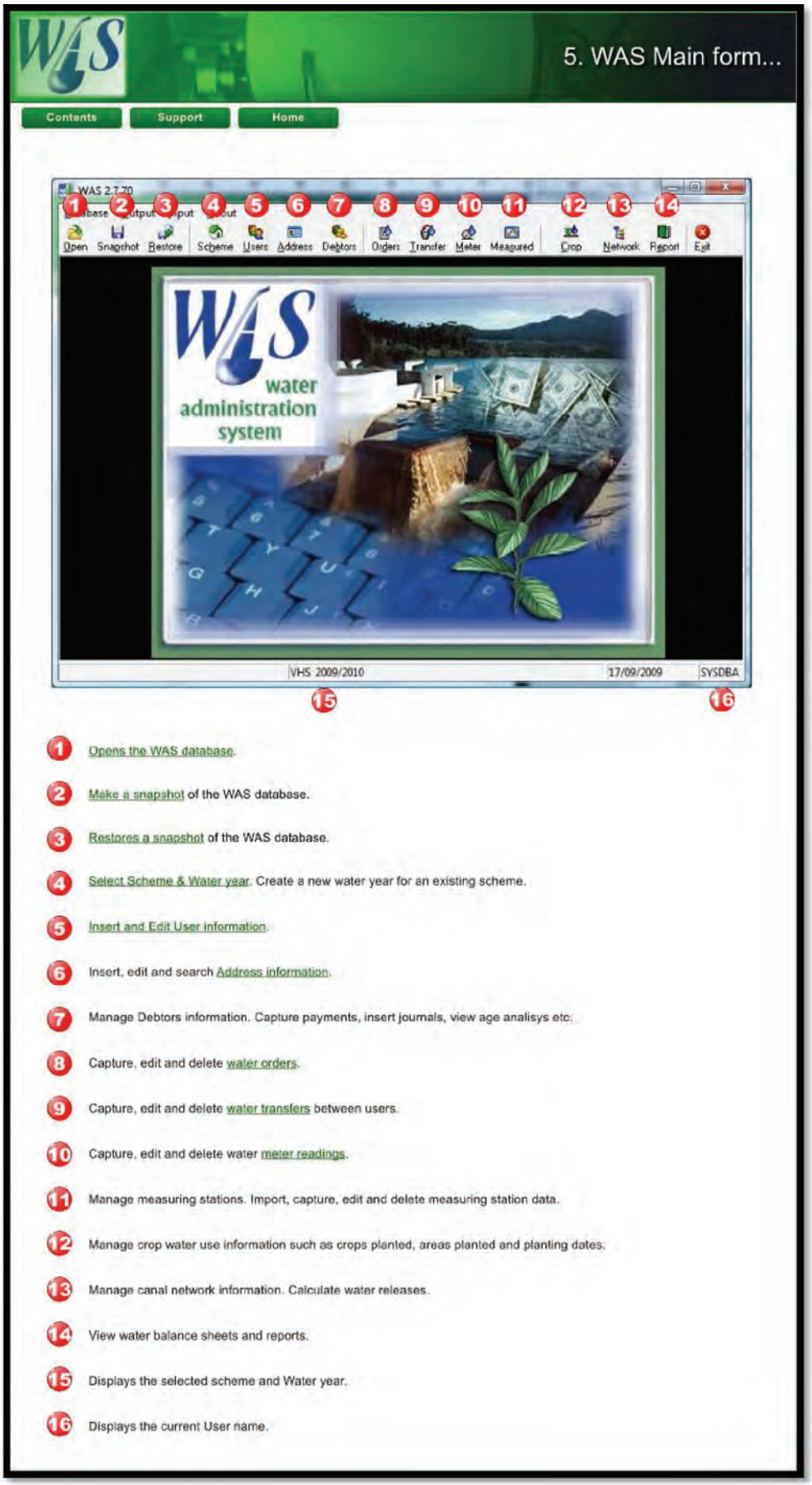


Figure 16 WAS Main form

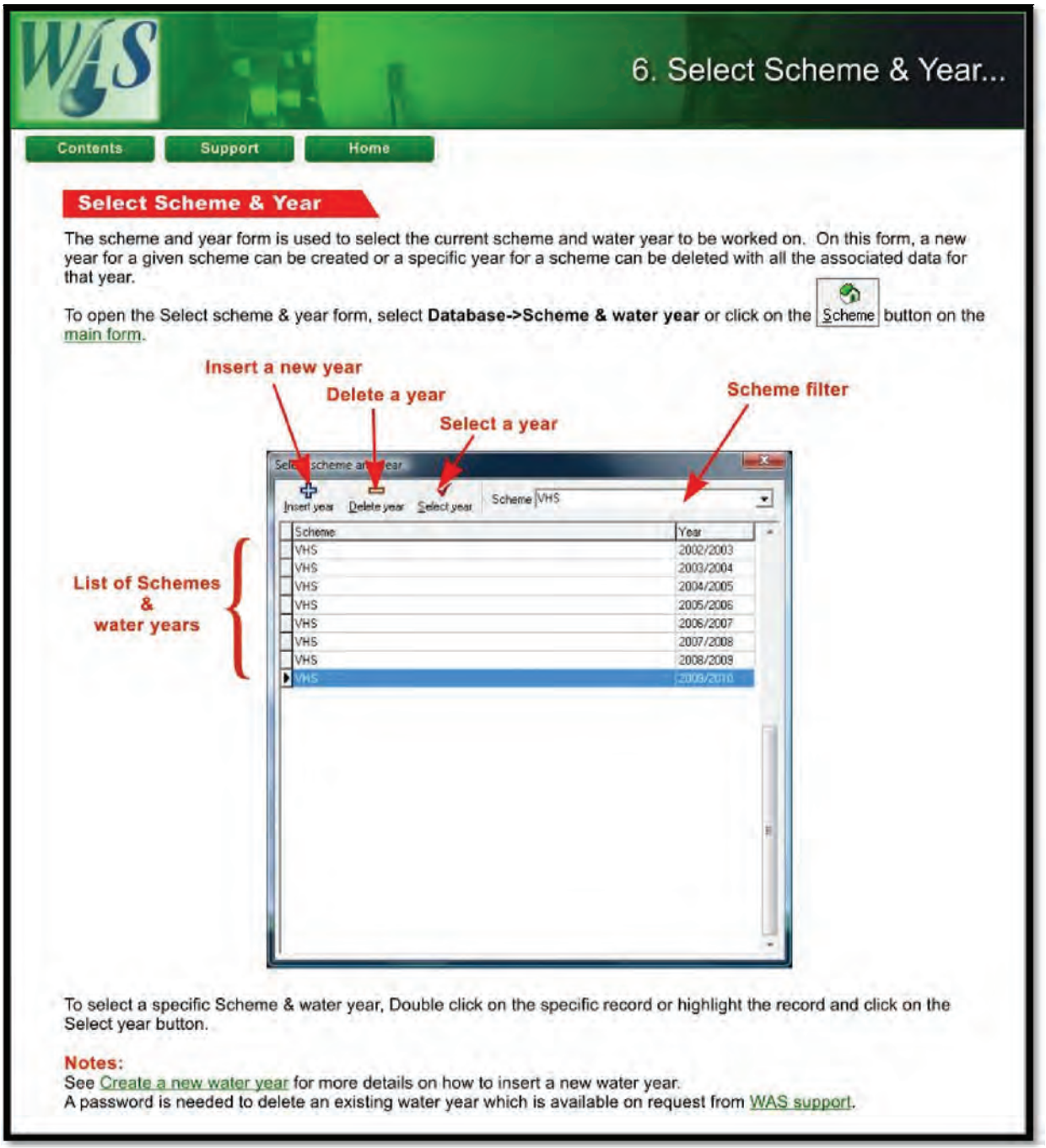


Figure 17 Select scheme and Year

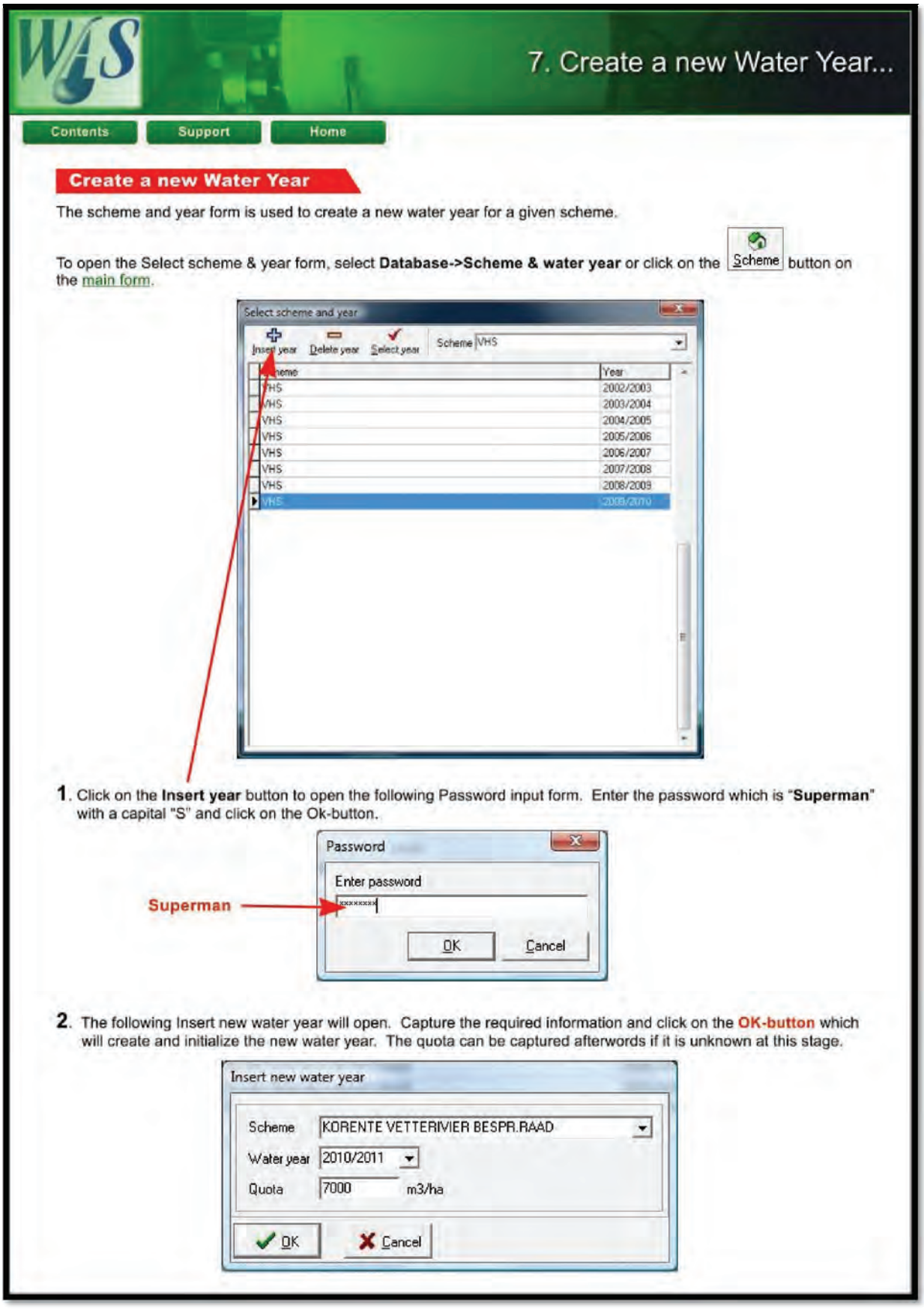


Figure 18 Create a new Water year

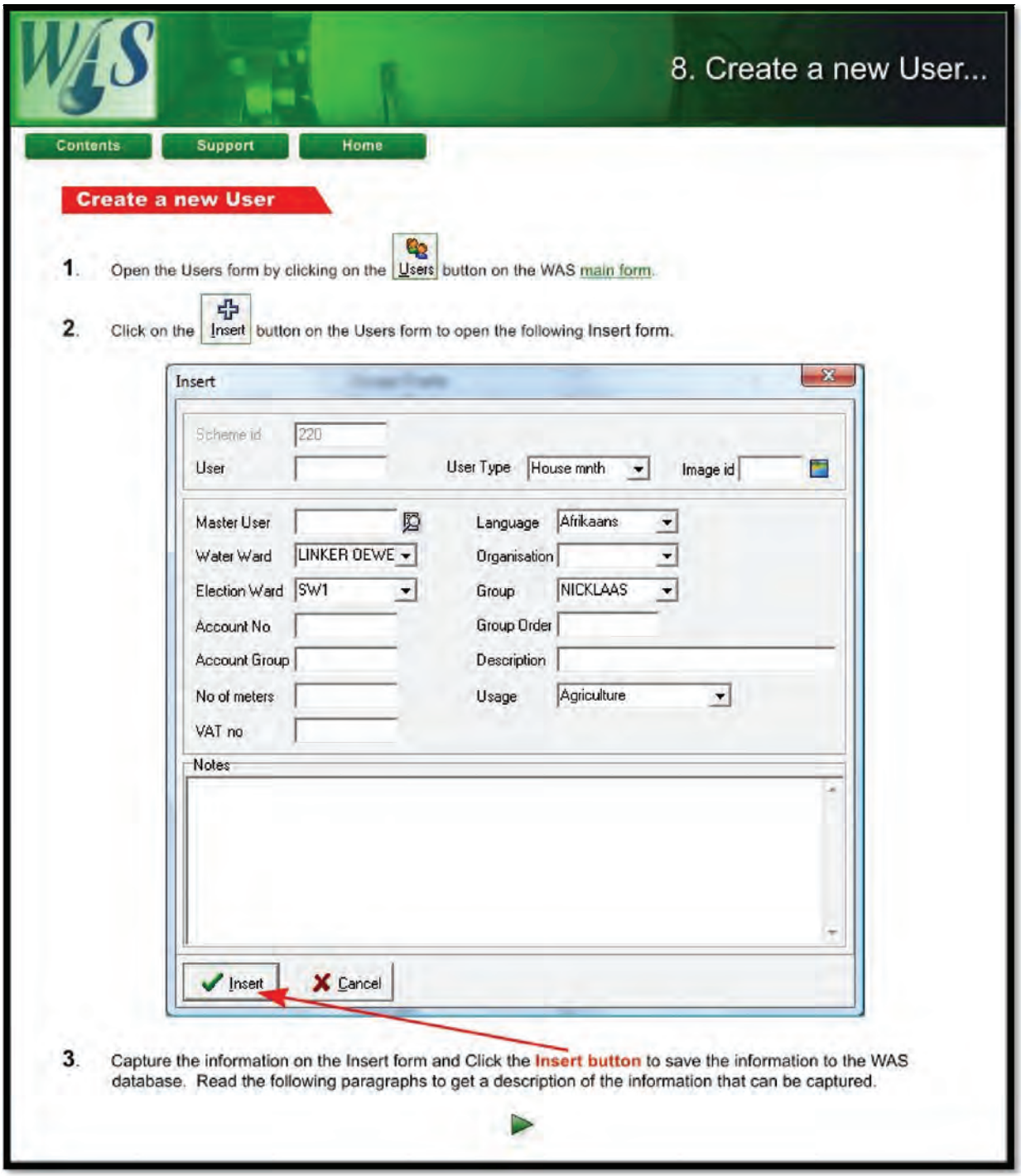


Figure 19 Create a new User p1

8. Create a new User...

Contents | Support | Home

User

The User field is a unique identification string that is used to identify a user throughout the WAS program. The field has a maximum width of 10 characters, which is in upper case. If you are using numerical values as user id's you need to pad it with zero's to ensure that the numbers are sorted in a numerical order. For example 0001, 0002 etc. If a user id is changed, all the user id's of the related information in the WAS database will also change.

User type

The user type is used to differentiate between the different types of users. The different user types are treated differently when calculating water quotas, water balances and generating invoices.

The following user types are used:

- Extension: A user of the type extension has a no scheduled area and no invoice will be generated. This type is used to link an extension to a master user for automatic water transfers from the master user to the extension. Automatic transfers will only take place when water is ordered on a water order form or a meter readings form.
- House mnth: Not used (included for backward compatibility).
- Ind mnth: Has a quota allocation (captured on the industrial quotas page) and is used by the debit accounting model to generate monthly invoices.
- Irrig mnth: Has scheduling (captured on the scheduled areas page) and is used by the debit accounting model to generate monthly invoices.

Image id

This field is used to link an image id to the specific user. The image can be viewed using the image speed button.

Master user

The main purpose of this field is to link extensions to master users. A master user can have an unlimited number of extensions linked to it and is used to transfer water automatically from the master user to the extension. If water is ordered on an extension that is linked to a master user, a water transfer (Input|Water|Water Transfer) is automatically generated between the master and the extension. The water balance of an extension will normally be zero because the water transferred to the extension will be equal to the water ordered on the extension. Water will automatically be transferred back from an extension to the master user if water is cancellation on an extension.

The master user is also used in water reports to group water Orders according to master users. A master user can be specified for all user types for grouping purposes. It makes it therefore possible to calculate the total water allocation and water balance of a number of plots that belongs to a single farmer.

Water ward

An irrigation scheme is normally divided into different water wards that can be assigned to a specific user. The list of available water wards is captured on the water wards form (Input|Lookups|Water wards). Water wards are extensively used in the reports to group information according to a specified water ward.

Election ward

An irrigation schemes is normally divided into different election wards that can be assigned to a specific user. The list of available election wards is captured on the election wards form (Input|Lookups|Election wards). The election ward is used generate the number of votes in an election ward and to print the voting list for each election ward. The voting lists are maintained and generated on the List of Ratable (LRA) form (Input|User information| List of Ratable (LRA)).

Account no

This is the account number for the specific user and it is a numerical value. The user identification string is normally used for the account number.

Account group

The Account group is a number assigned to users that belongs to the same owner in order to group accounts before printing invoices.

No of meters

The number of meters installed for this user. This is used for billing purposes where the number of meters is multiplied by the meter maintenance tariff that is specified in the tariff set.

VAT no

The value added tax number of the user that is printed on the invoice.

Language

A language of preference can be selected from a drop down list. Only the invoices printed by the debit accounting model are affected by this option.

Organisation

The organisation that is relevant to a particular user can be selected from a drop down list containing the following options:

- GWS (Government water scheme)
- Irrigation Board
- Municipality
- Water Board

Group

The group specifies the name of the group assigned to the specific user and can be selected from a drop down list. The Group field is used to group users according to the specified group id. The available groups in the drop down list are captured on the group lookup form (Input|Lookups|Groups). The Group has an effect on the Distribution sheet (Output|Water|Distribution sheet), water Orders (Input|Water|Orders) and the meter readings (Input|Water|Meter readings).

Group order

The group order specifies the user sorting order within a specific group. The Group order field is used to group users according to the specified group id and group order. The Group order has an effect on the Distribution sheet (Output->Water->Distribution sheet) and the meter readings.

Description

This column is used to give a longer description of a specific user. The user column only allows 10 characters while the description can take 30 characters.

Usage

The water use type of the specific user. This type is used in the Water Use Efficiency Accounting (WUEA) report to calculate different water use totals. The different water usage types include:

- Agriculture
- Household
- Industrial
- Municipality
- Other
- Tail end

Notes

Capture any note relevant to the specific user in the Note box.

Figure 20 Create a new User p2

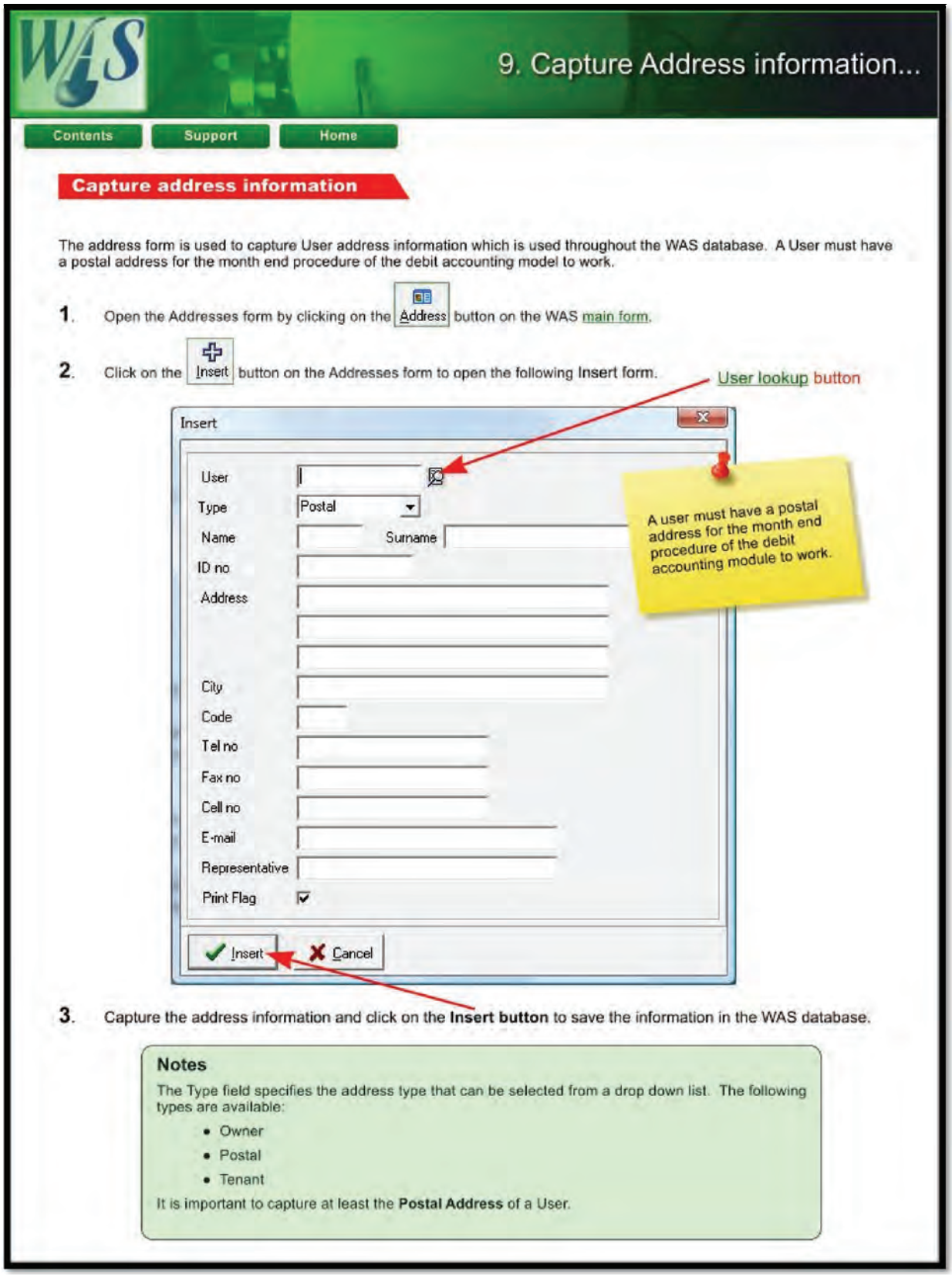


Figure 21 Capture address information

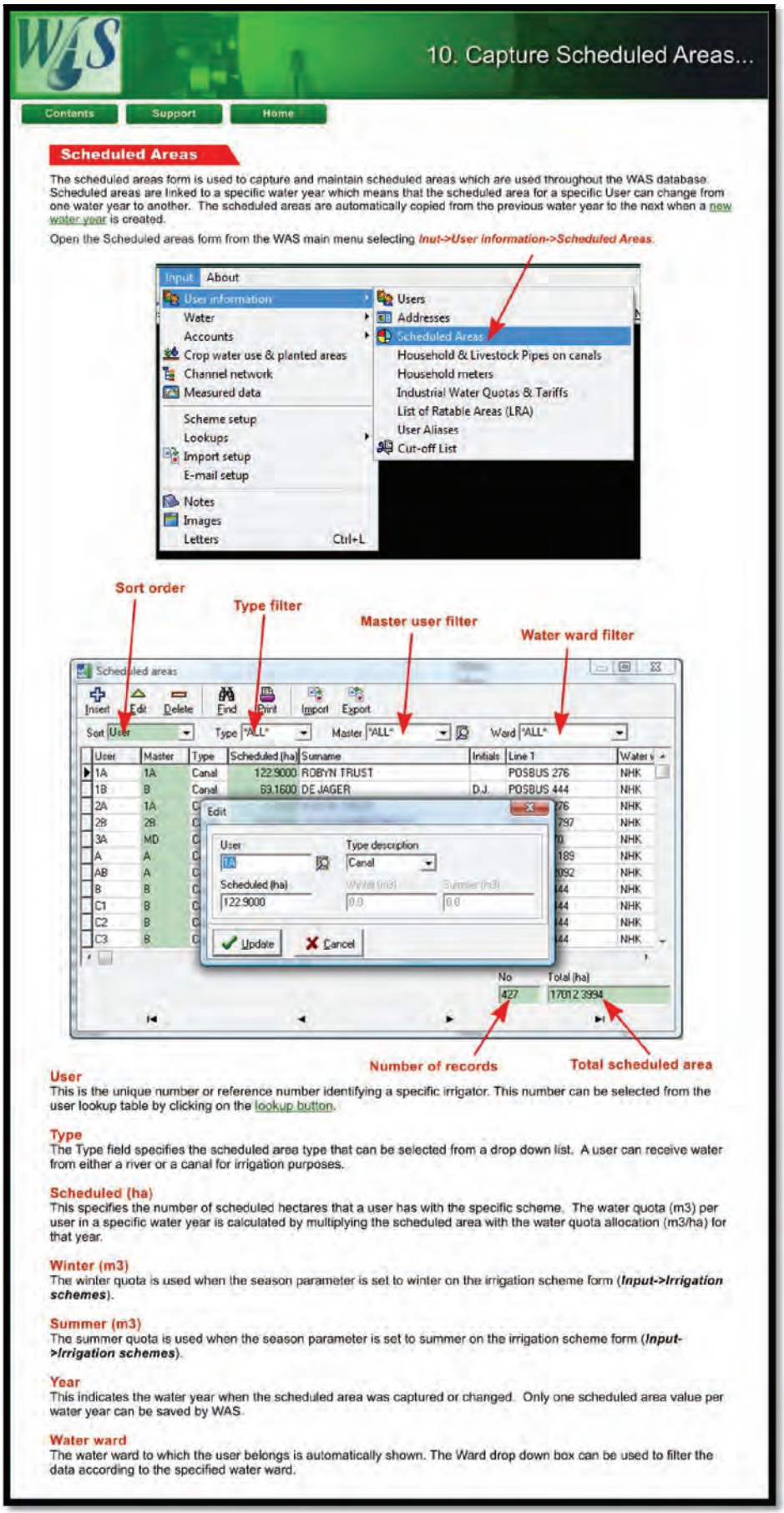


Figure 22 Capture scheduled areas

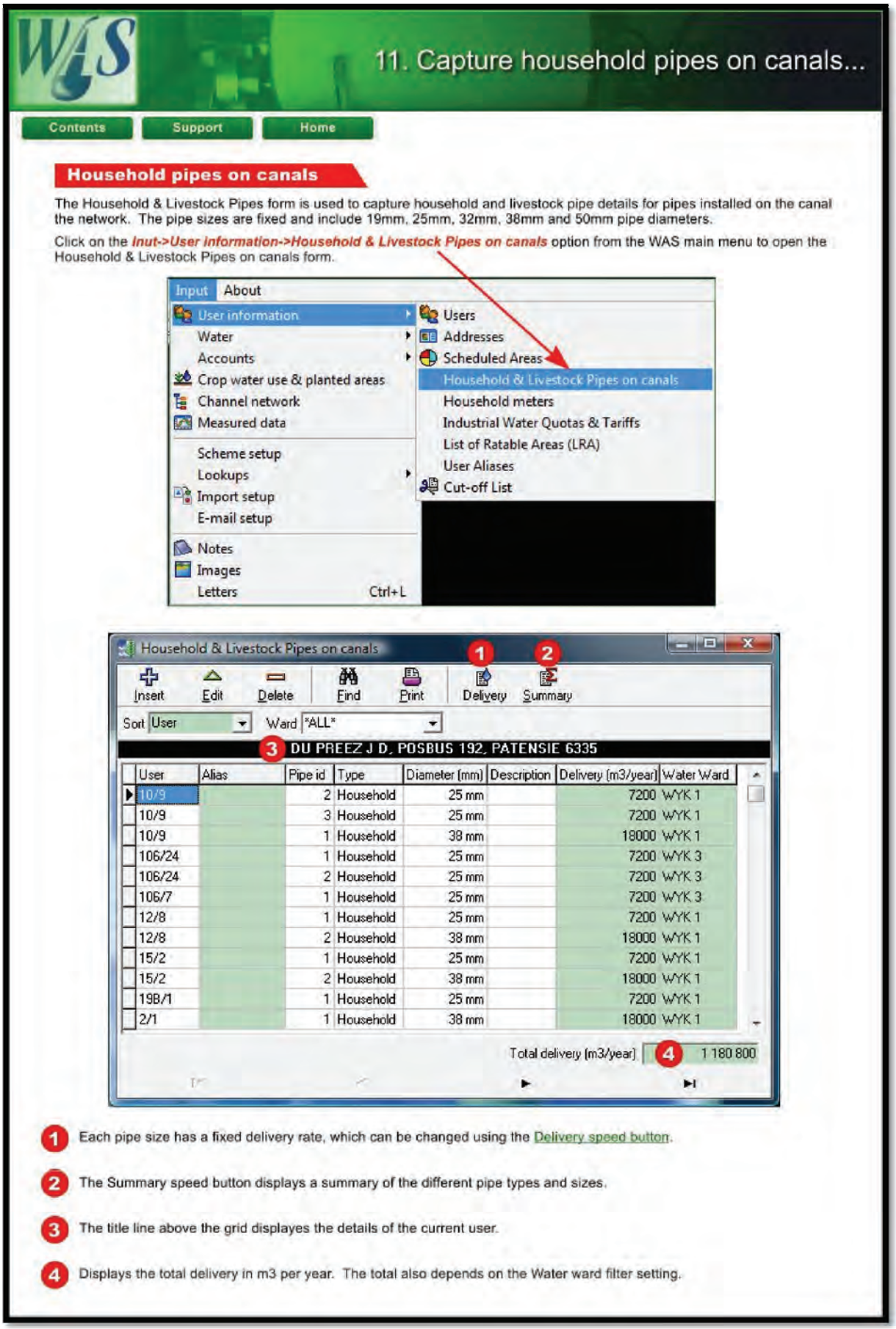


Figure 23 Capture household pipes on canals

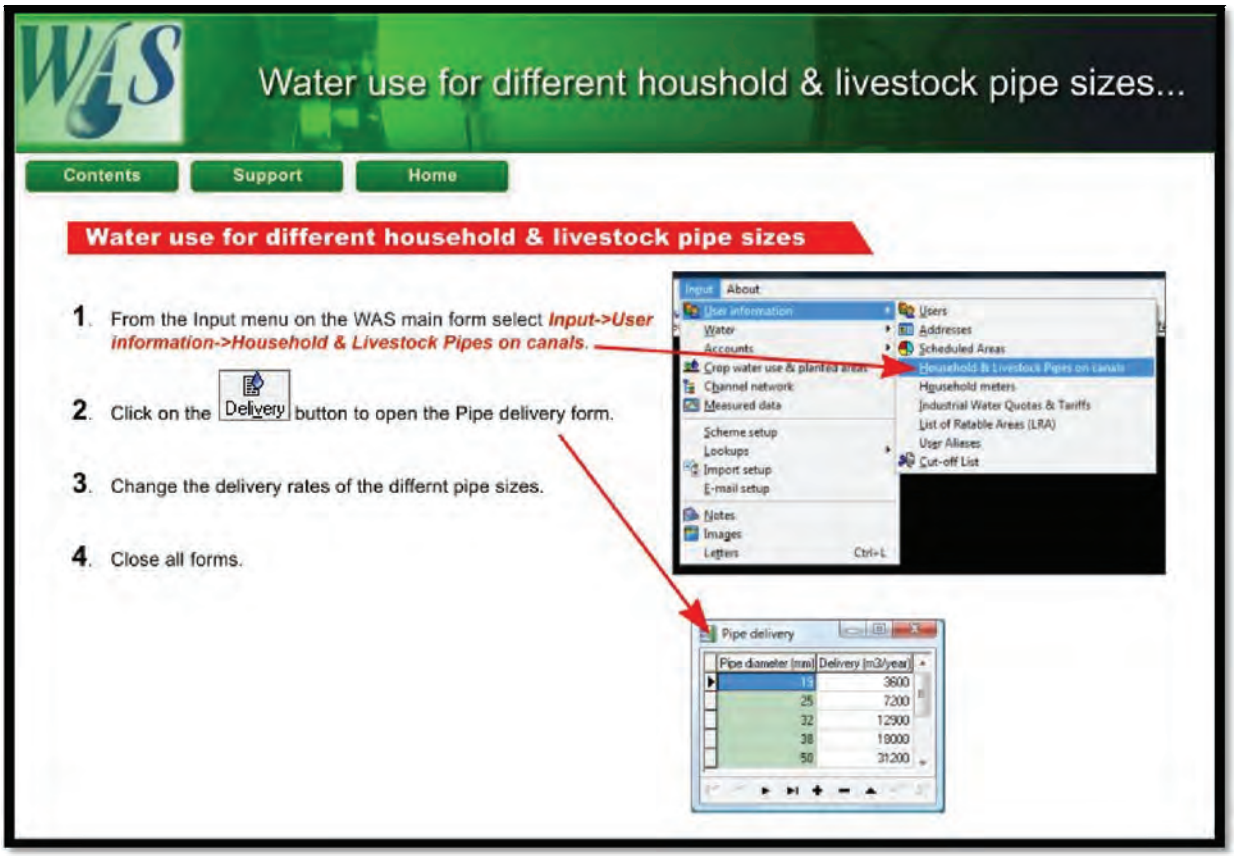


Figure 24 Water use for different household & livestock pipe sizes

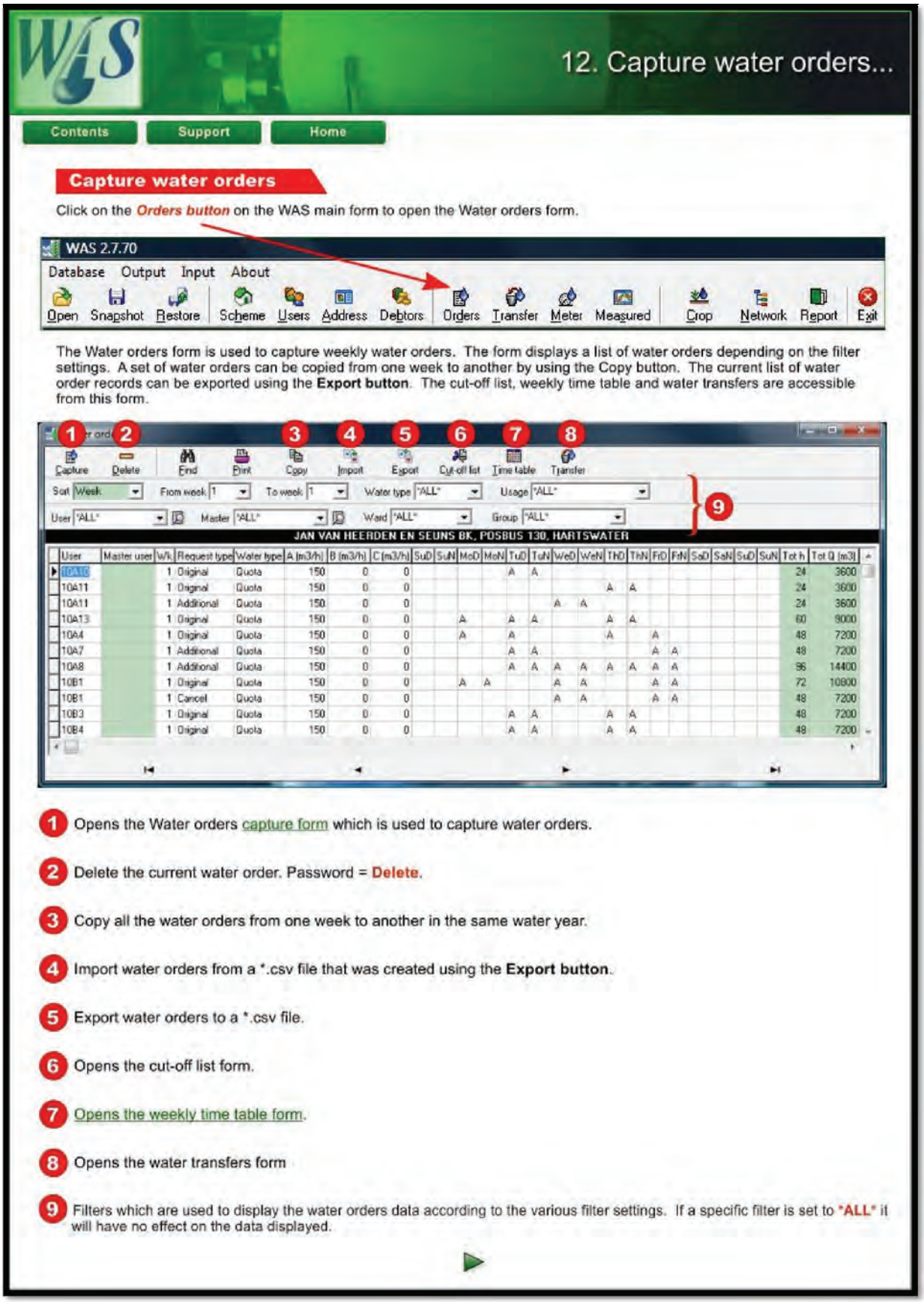


Figure 25 Capture water orders

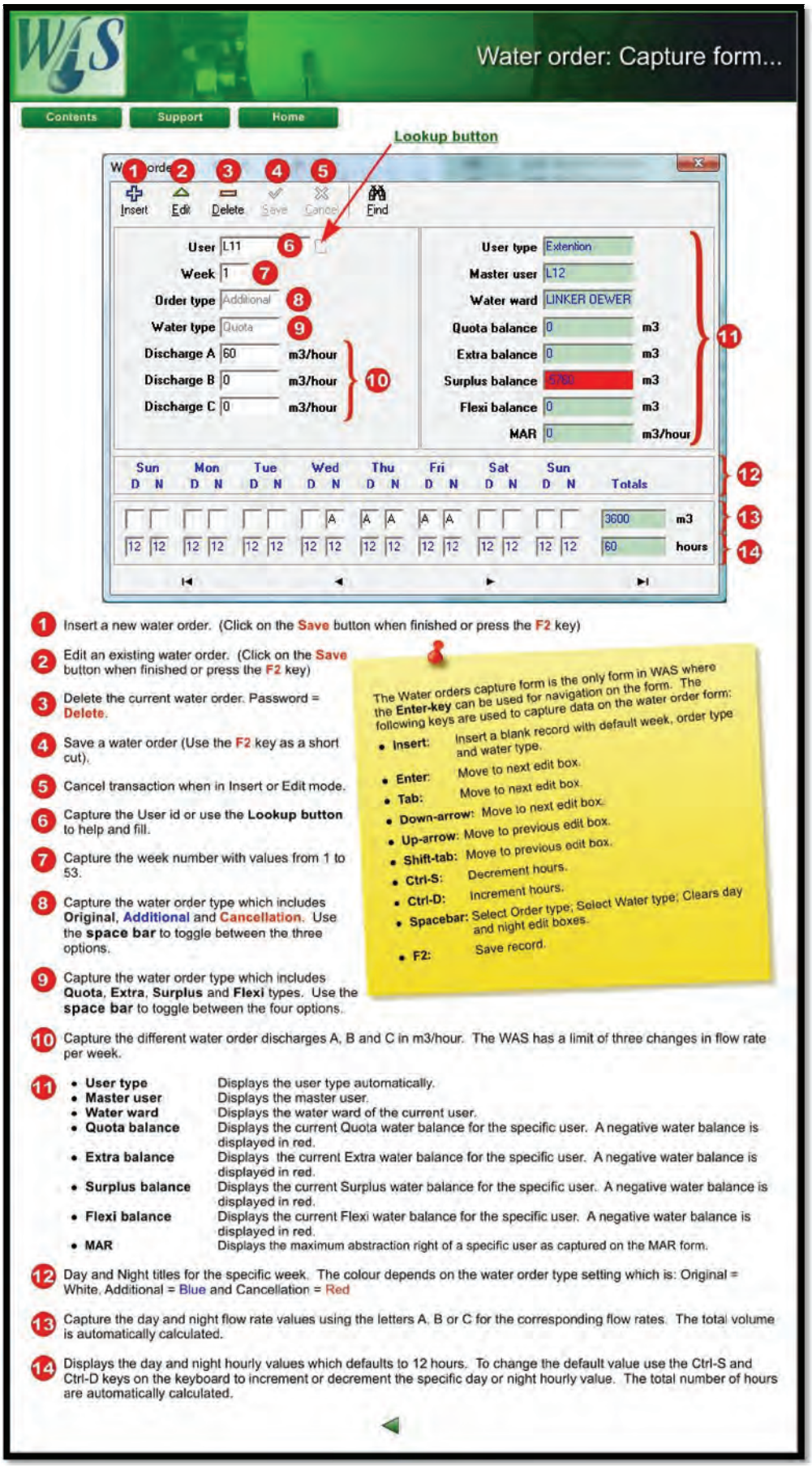


Figure 26 Water order capturing form

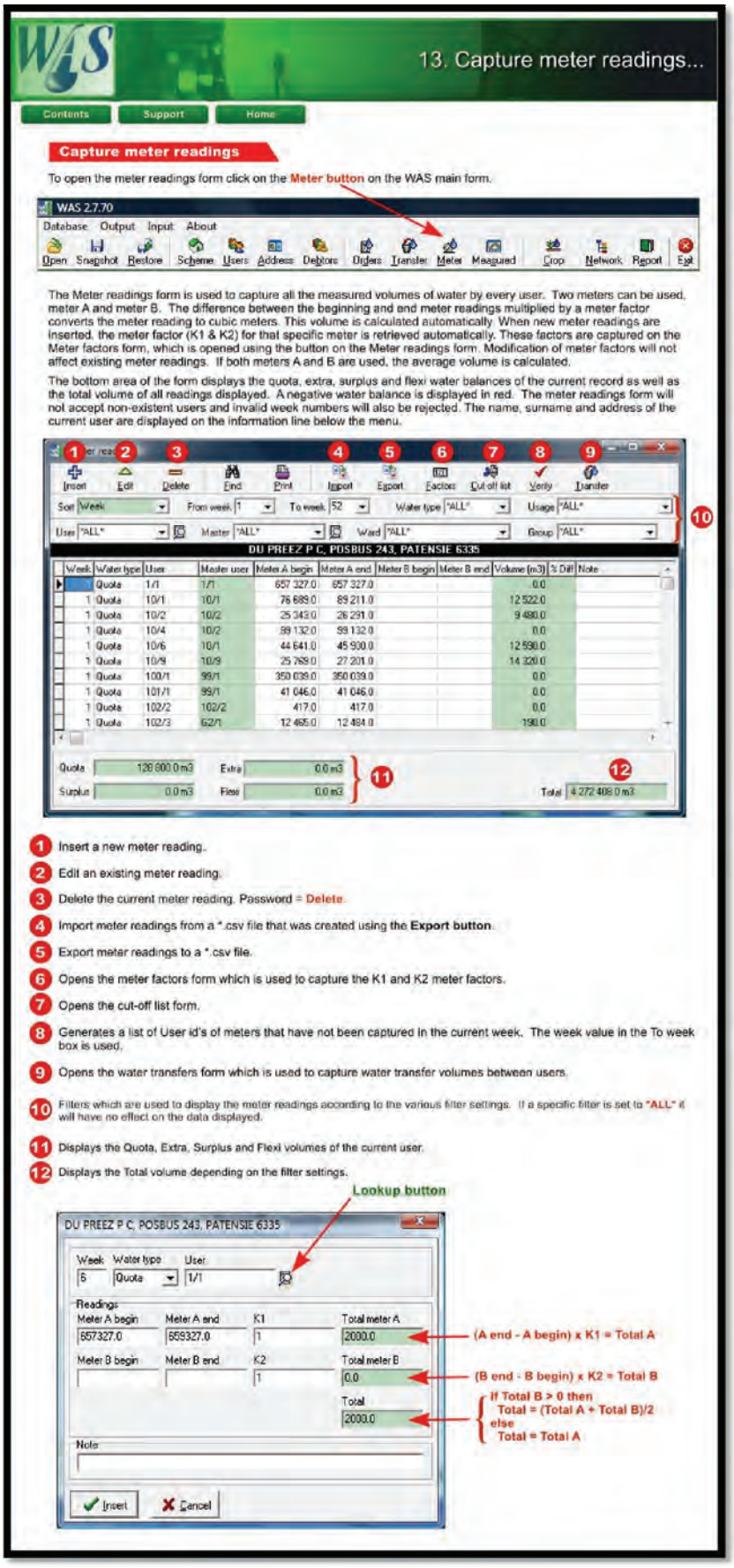


Figure 27 Capture meter readings

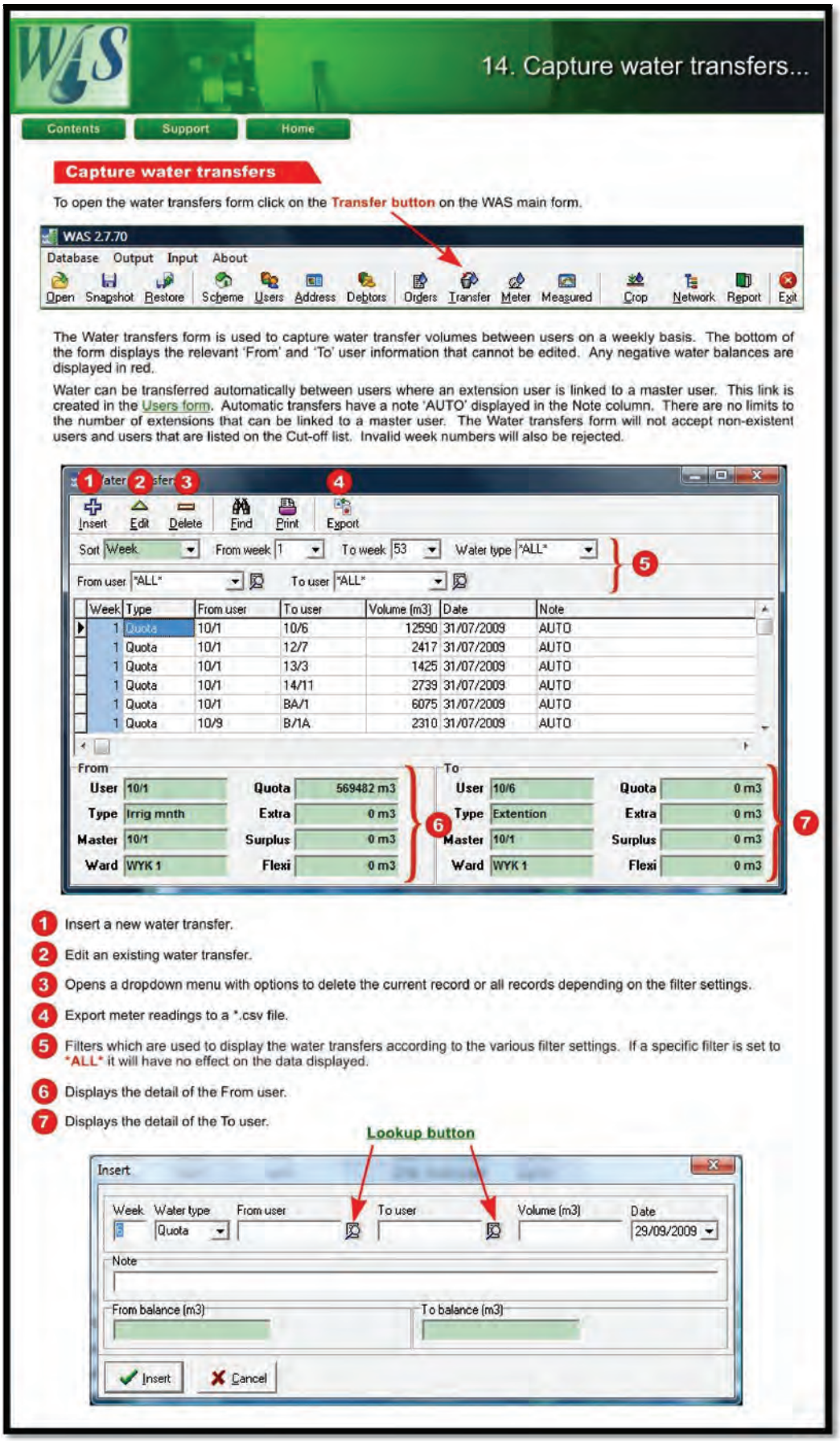


Figure 28 Capture water transfers

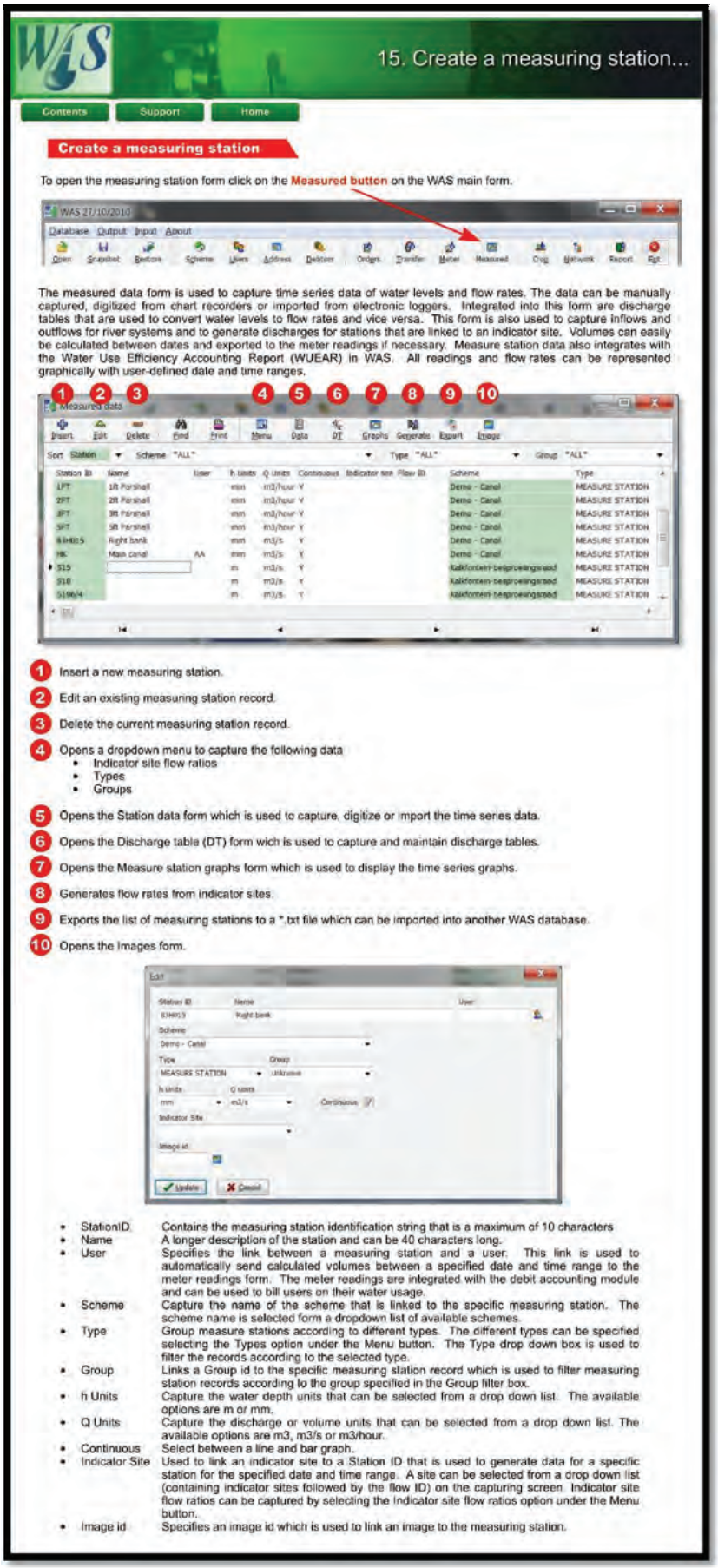


Figure 29 Create a measuring station

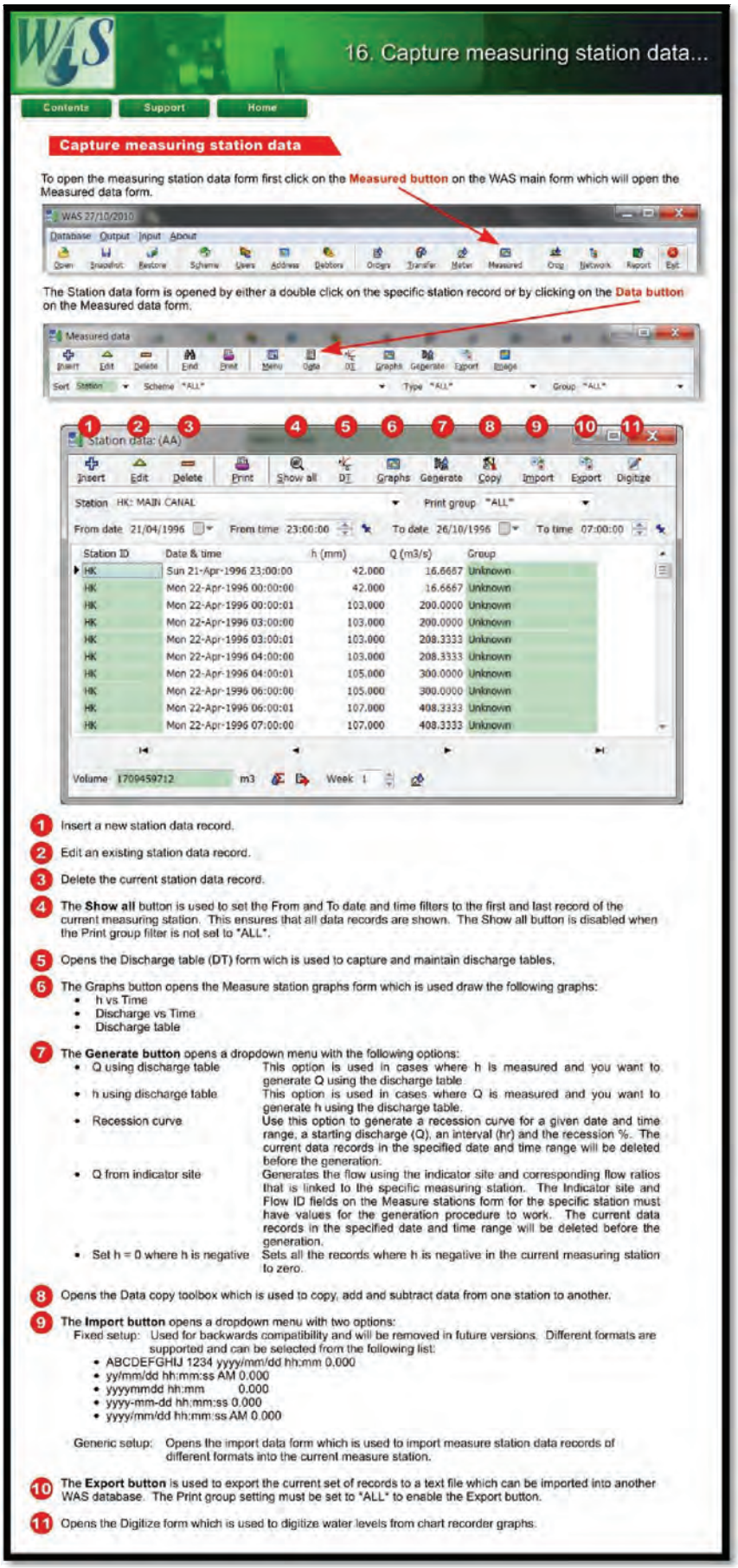


Figure 30 Capture measuring station data

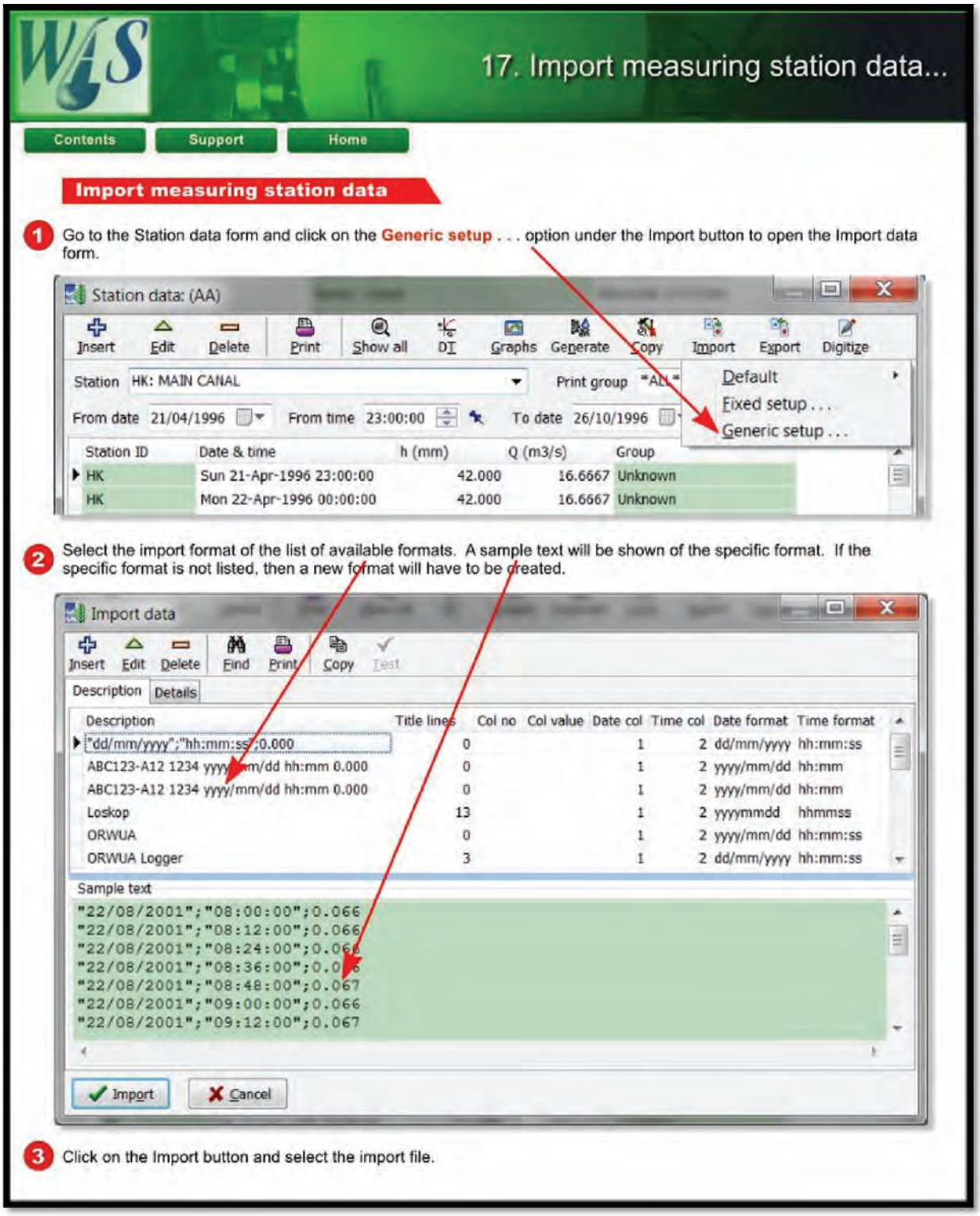


Figure 31 Import measuring station data

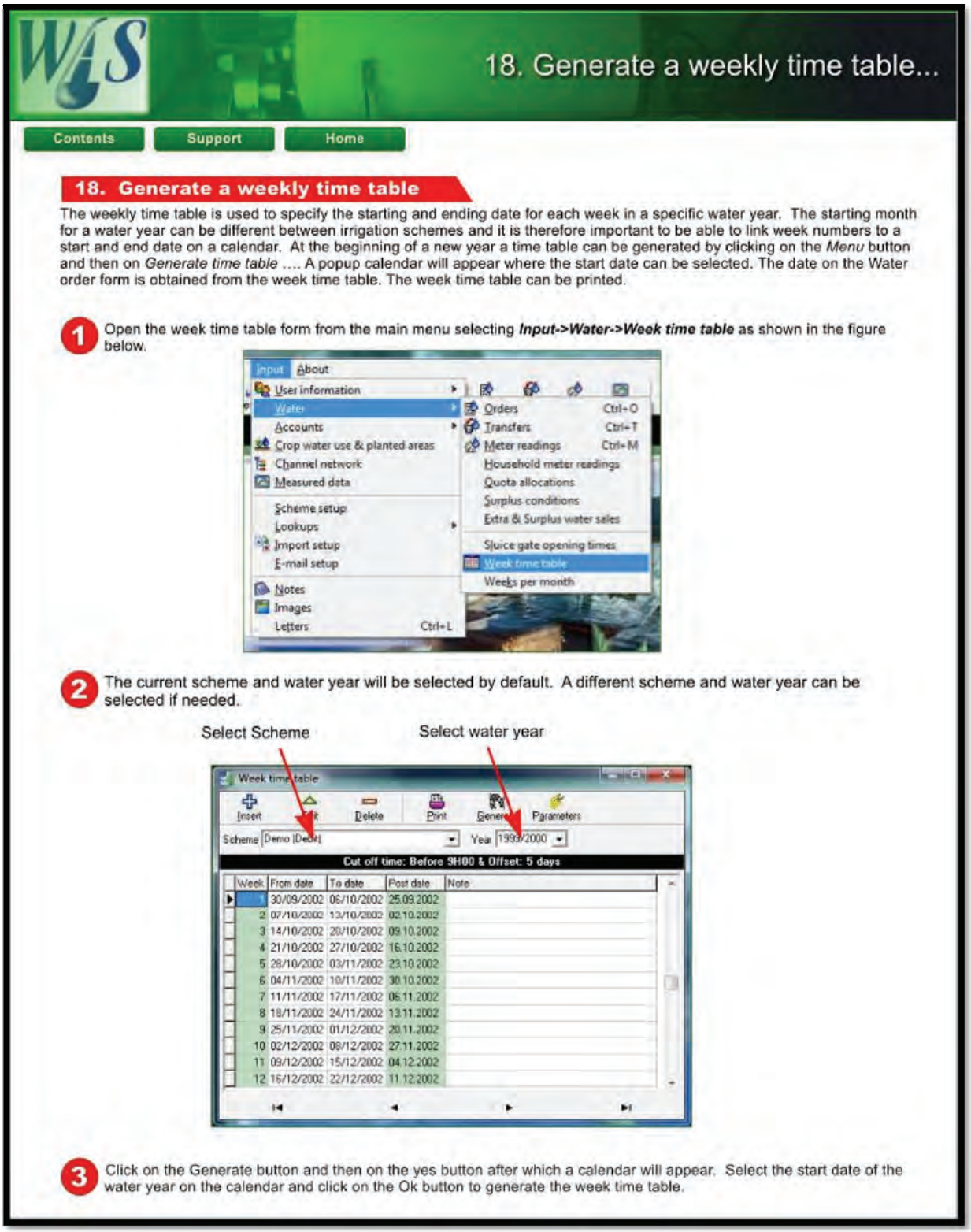


Figure 32 Generate a weekly time table

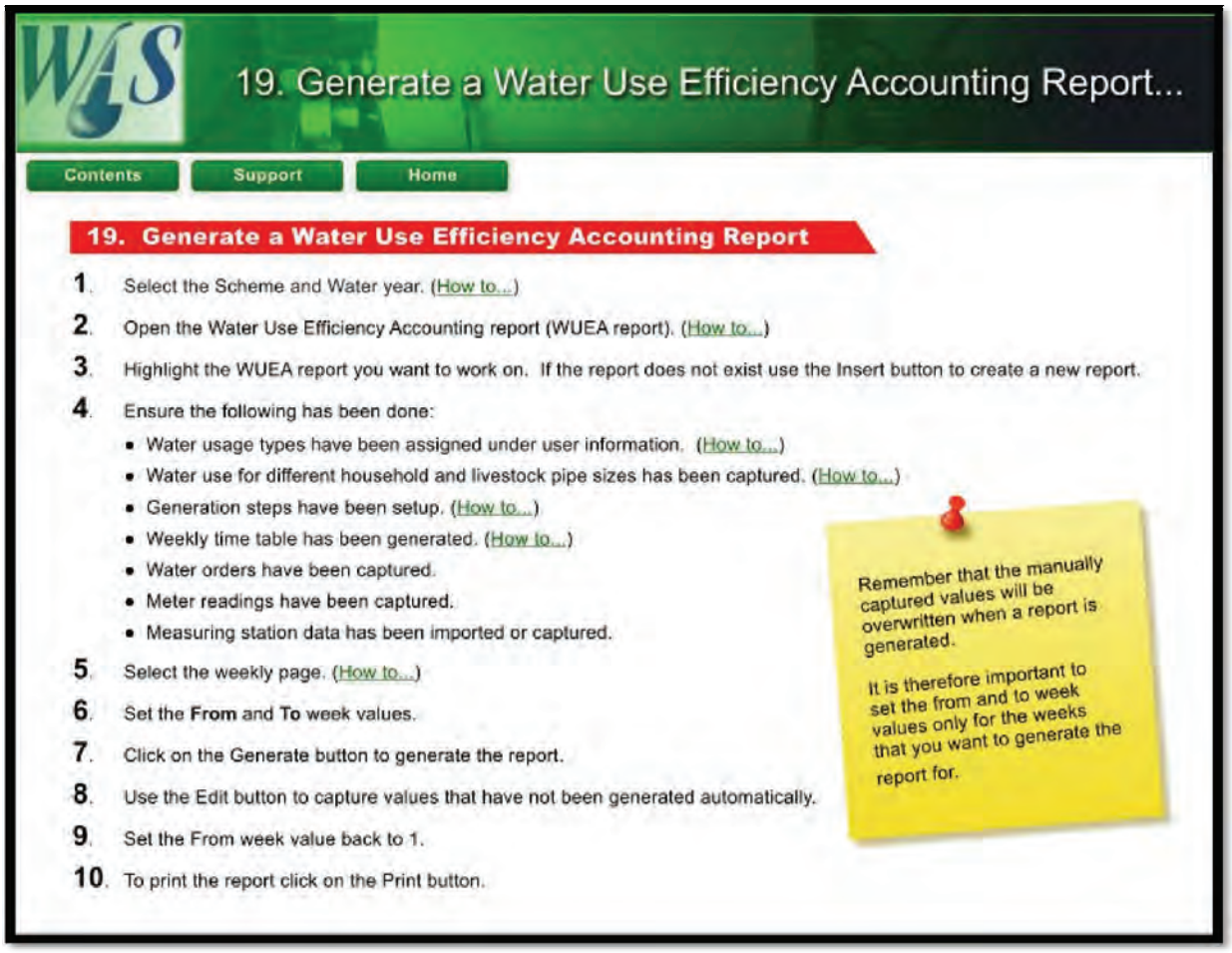


Figure 33 Generate WUEA report

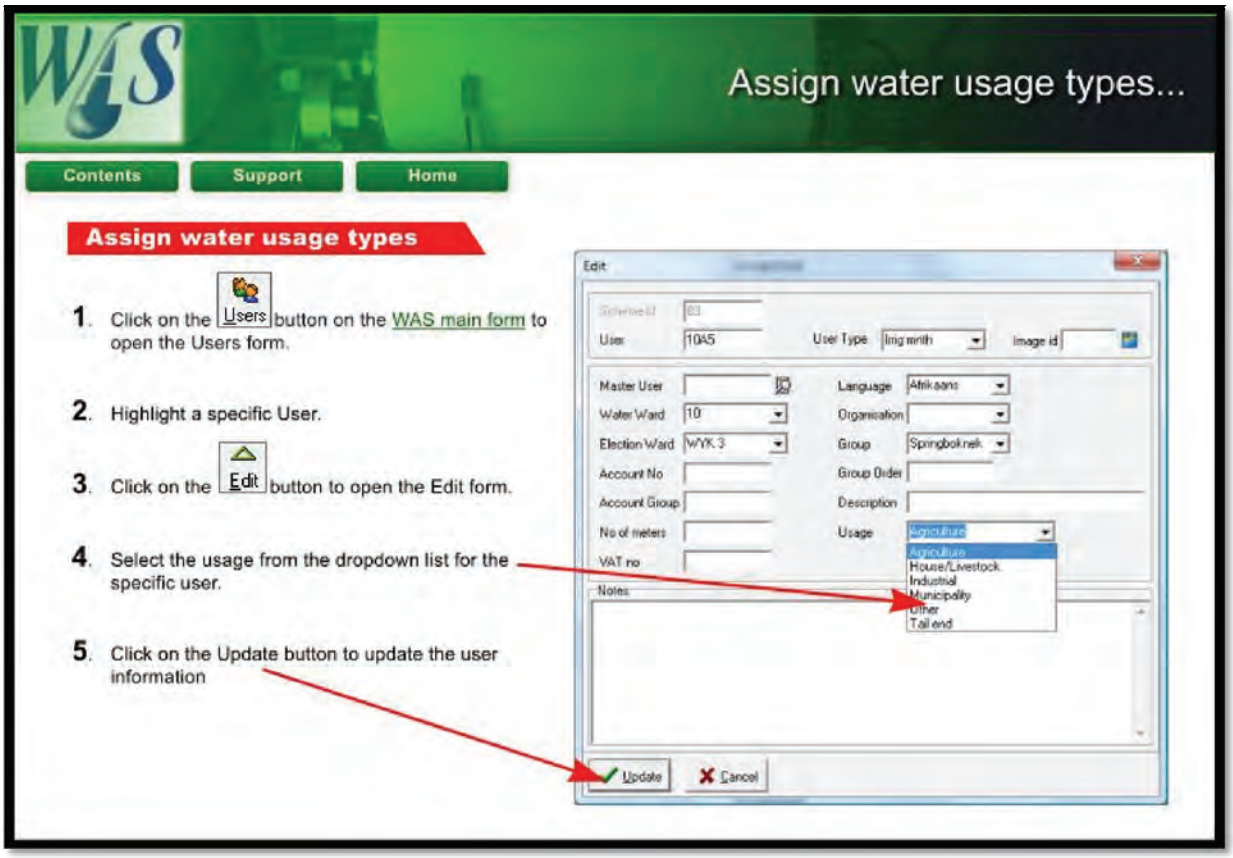


Figure 34 Assign water usage types

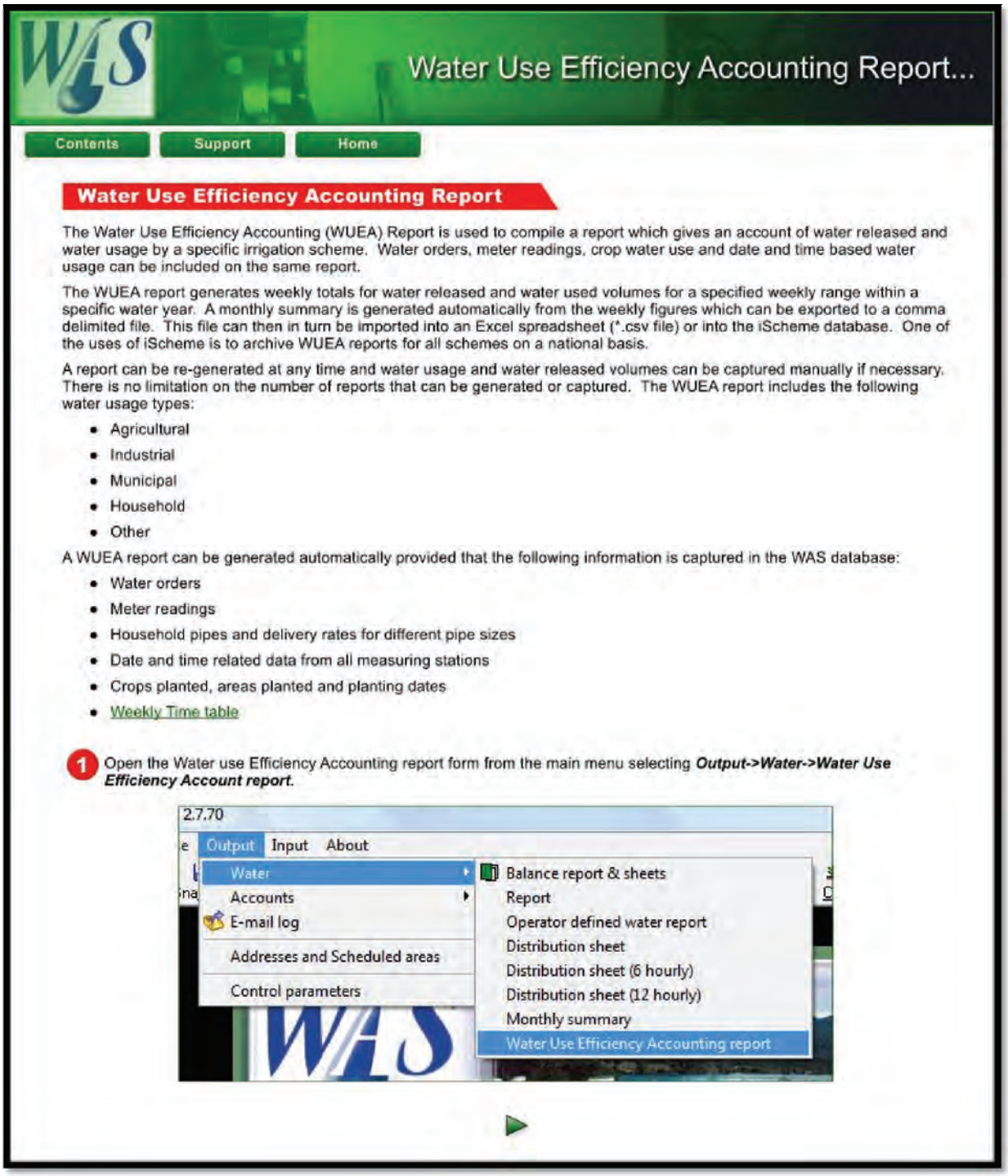


Figure 35 WUEA report p1

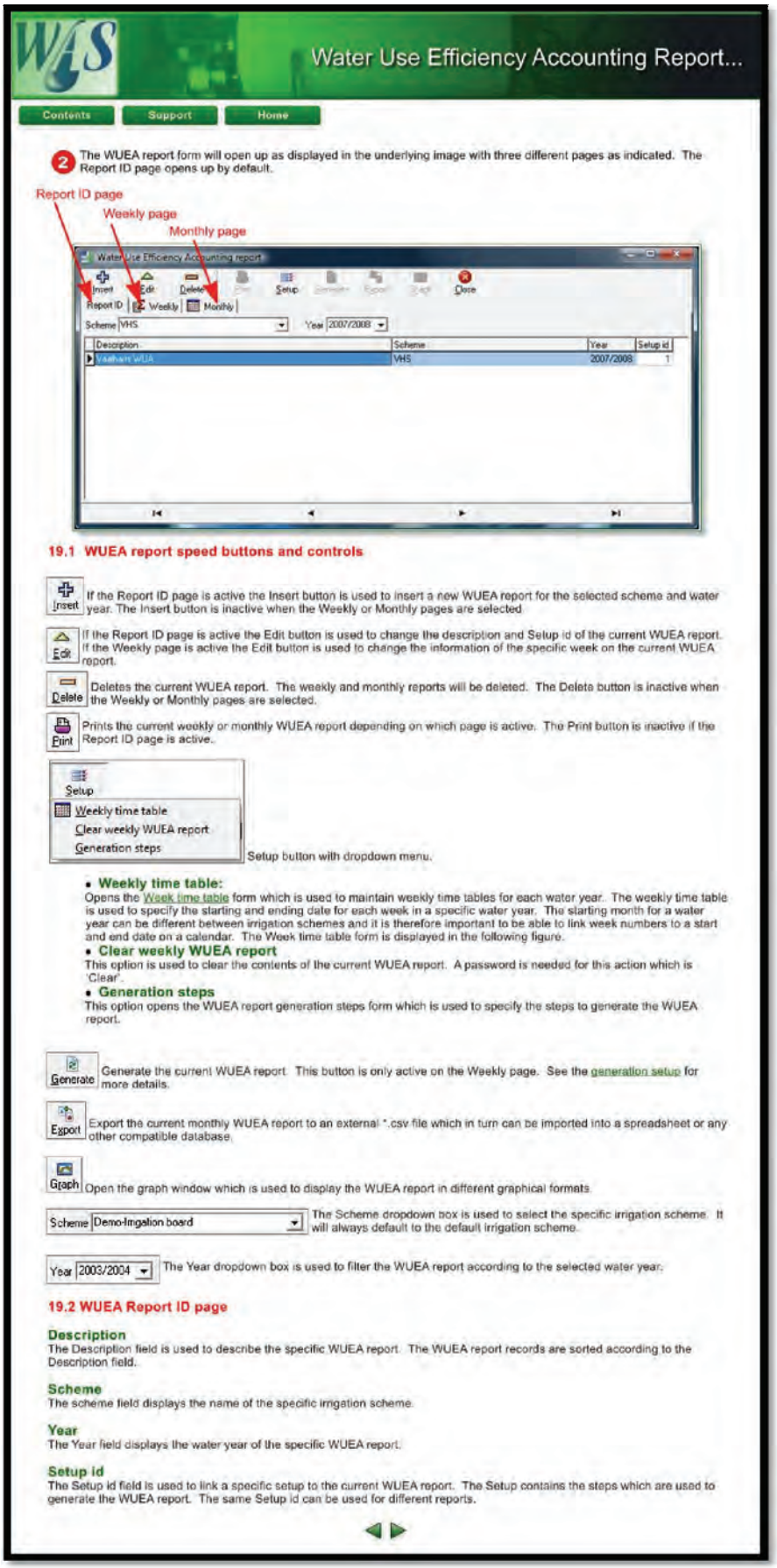
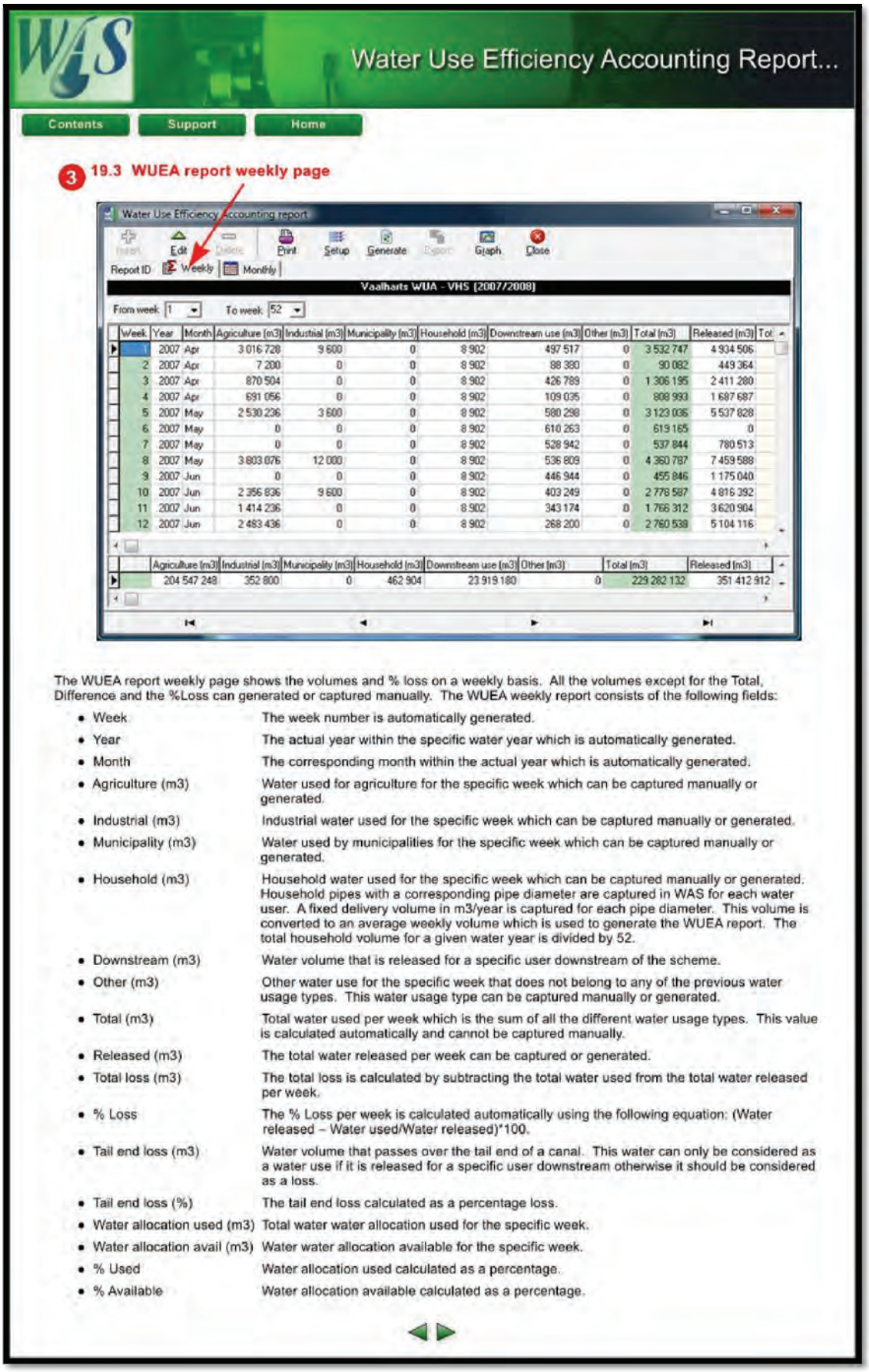


Figure 36 WUEA report p2



The WUEA report weekly page shows the volumes and % loss on a weekly basis. All the volumes except for the Total, Difference and the %Loss can generated or captured manually. The WUEA weekly report consists of the following fields:

- Week — The week number is automatically generated.
- Year — The actual year within the specific water year which is automatically generated.
- Month — The corresponding month within the actual year which is automatically generated.
- Agriculture (m3) — Water used for agriculture for the specific week which can be captured manually or generated.
- Industrial (m3) — Industrial water used for the specific week which can be captured manually or generated.
- Municipality (m3) — Water used by municipalities for the specific week which can be captured manually or generated.
- Household (m3) — Household water used for the specific week which can be captured manually or generated. Household pipes with a corresponding pipe diameter are captured in WAS for each water user. A fixed delivery volume in m3/year is captured for each pipe diameter. This volume is converted to an average weekly volume which is used to generate the WUEA report. The total household volume for a given water year is divided by 52.
- Downstream (m3) — Water volume that is released for a specific user downstream of the scheme.
- Other (m3) — Other water use for the specific week that does not belong to any of the previous water usage types. This water usage type can be captured manually or generated.
- Total (m3) — Total water used per week which is the sum of all the different water usage types. This value is calculated automatically and cannot be captured manually.
- Released (m3) — The total water released per week can be captured or generated.
- Total loss (m3) — The total loss is calculated by subtracting the total water used from the total water released per week.
- % Loss — The % Loss per week is calculated automatically using the following equation: (Water released – Water used/Water released)*100.
- Tail end loss (m3) — Water volume that passes over the tail end of a canal. This water can only be considered as a water use if it is released for a specific user downstream otherwise it should be considered as a loss.
- Tail end loss (%) — The tail end loss calculated as a percentage loss.
- Water allocation used (m3) — Total water water allocation used for the specific week.
- Water allocation avail (m3) — Water water allocation available for the specific week.
- % Used — Water allocation used calculated as a percentage.
- % Available — Water allocation available calculated as a percentage.

Figure 37 WUEA report p3

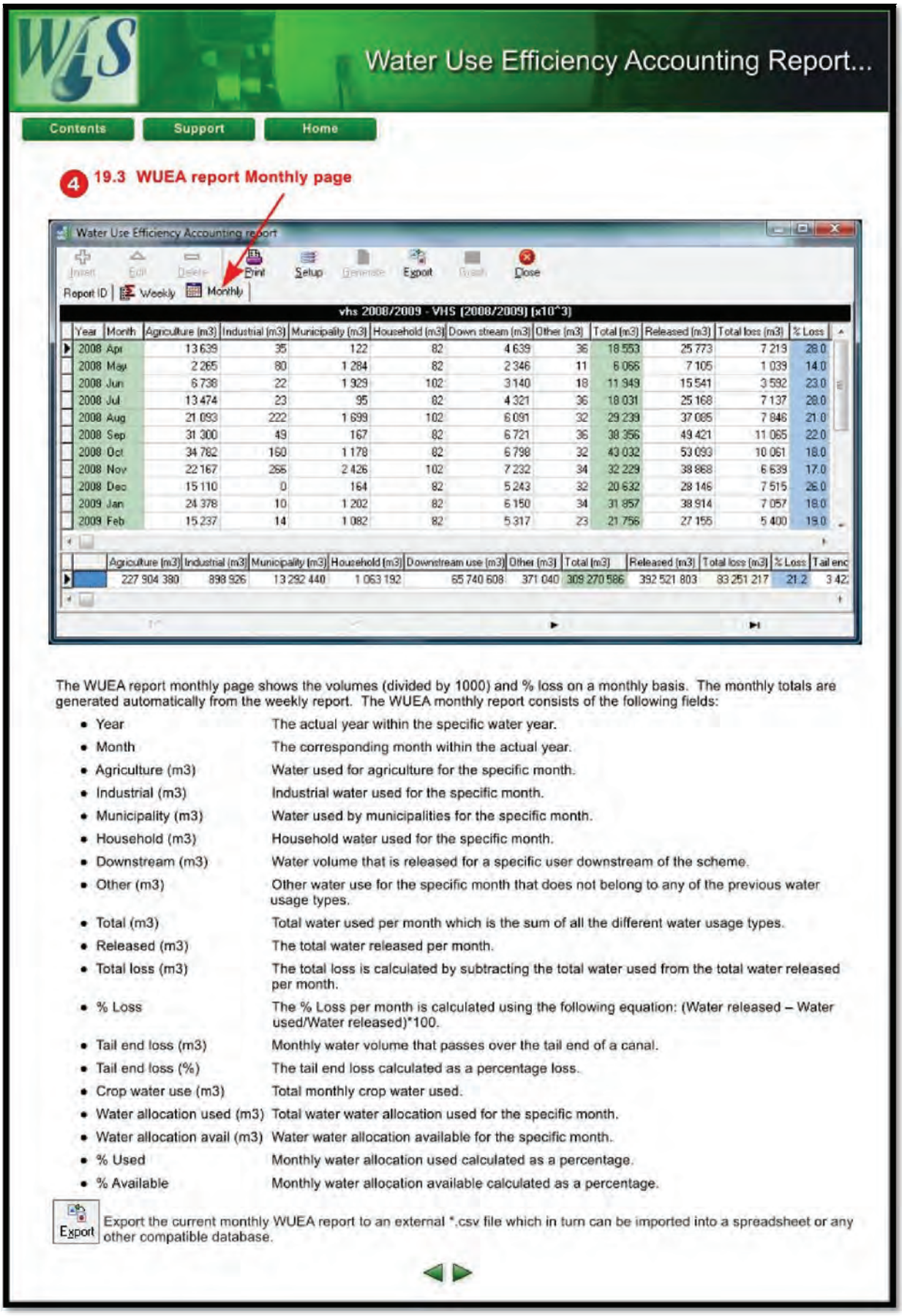


Figure 38 WUEA report p4

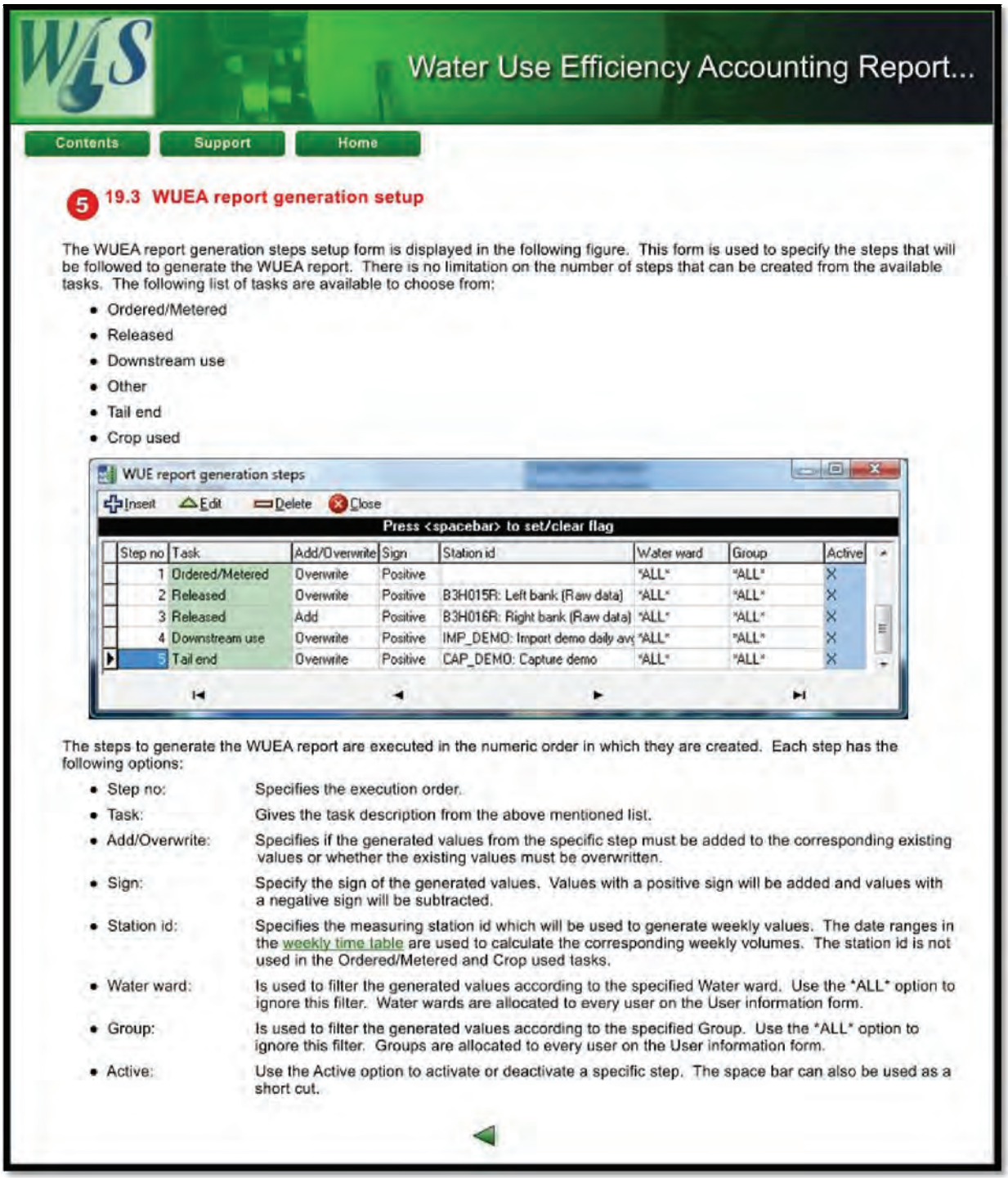


Figure 39 WUEA report p5

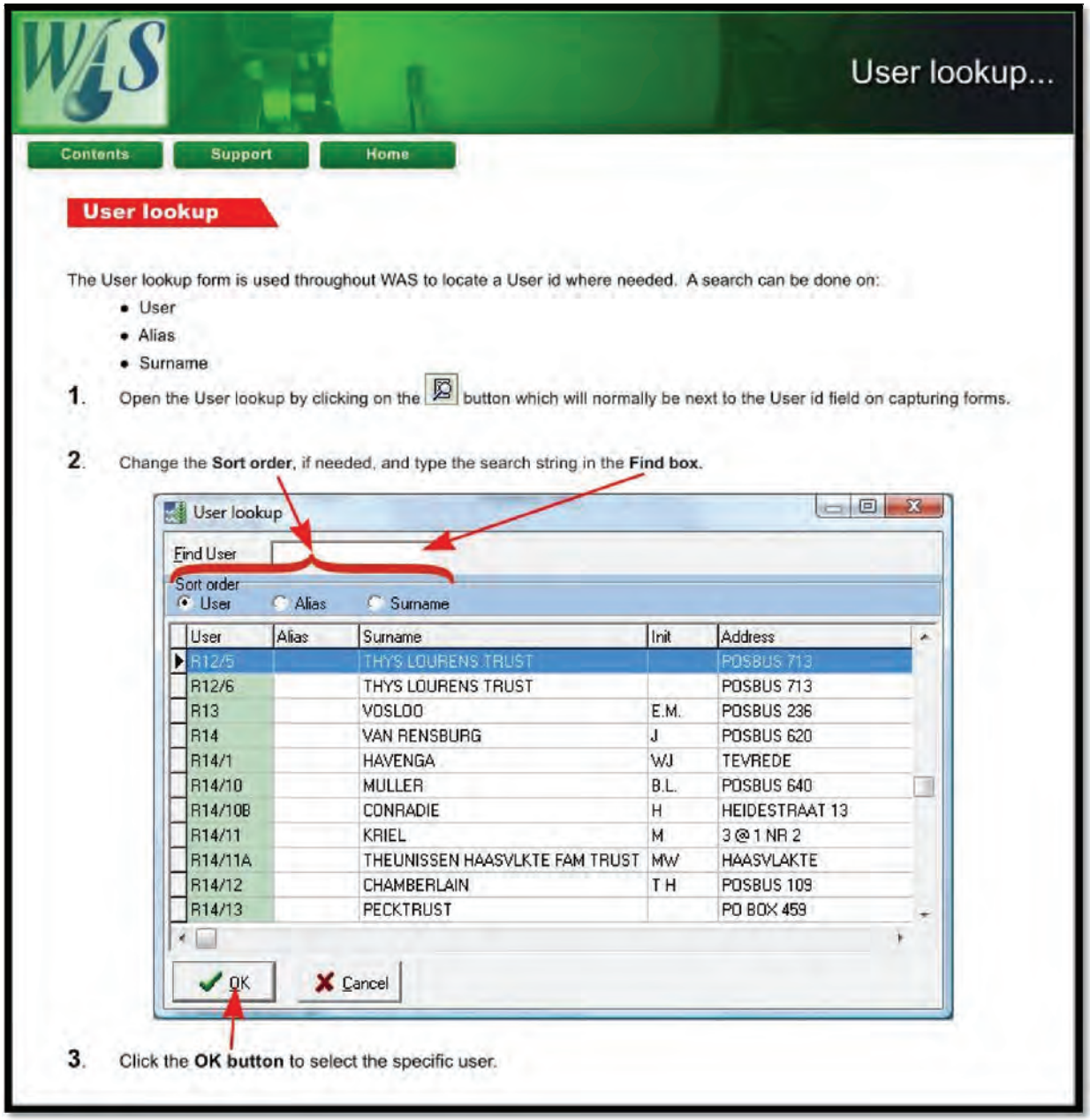


Figure 40 User lookup

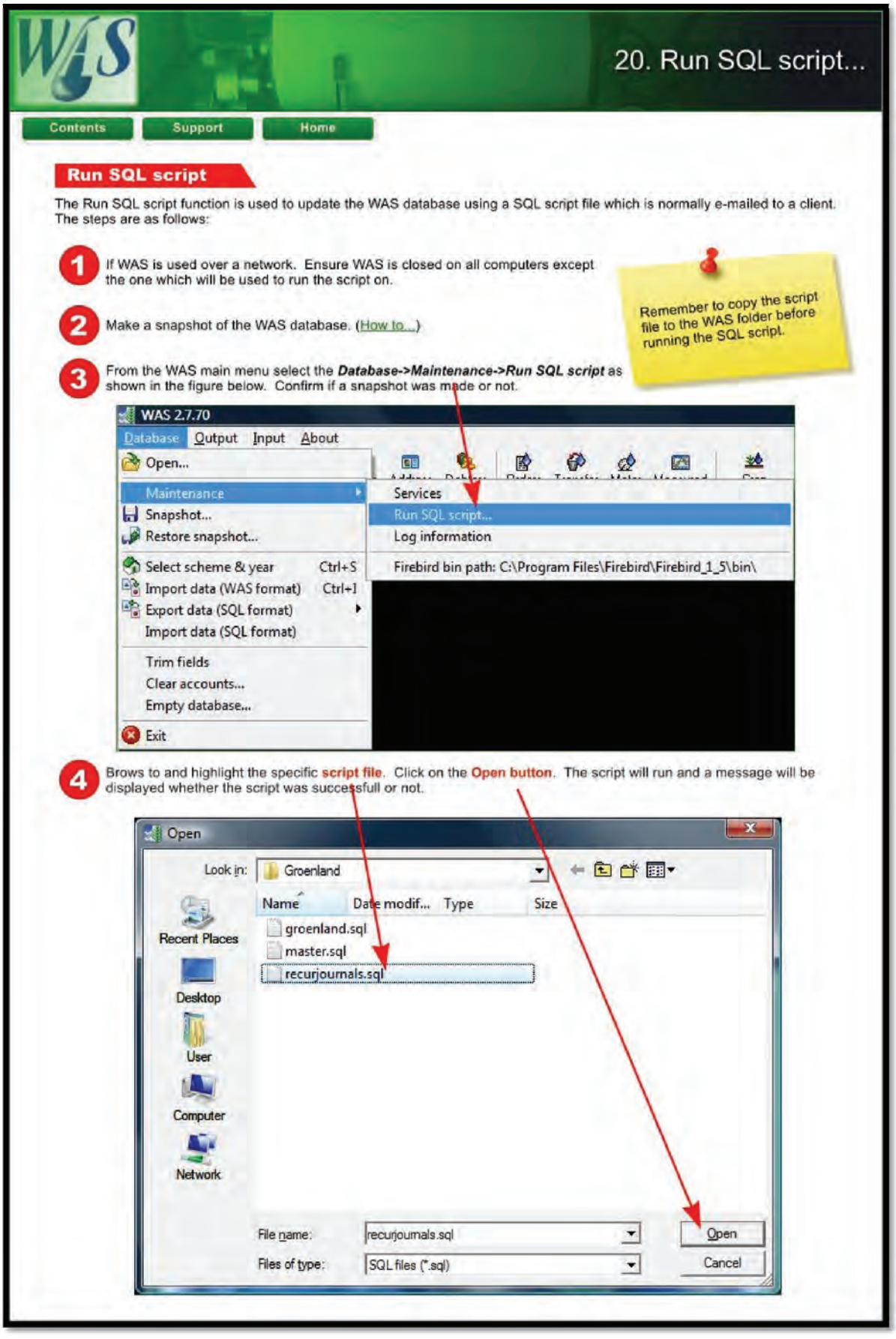


Figure 41 Run SQL script

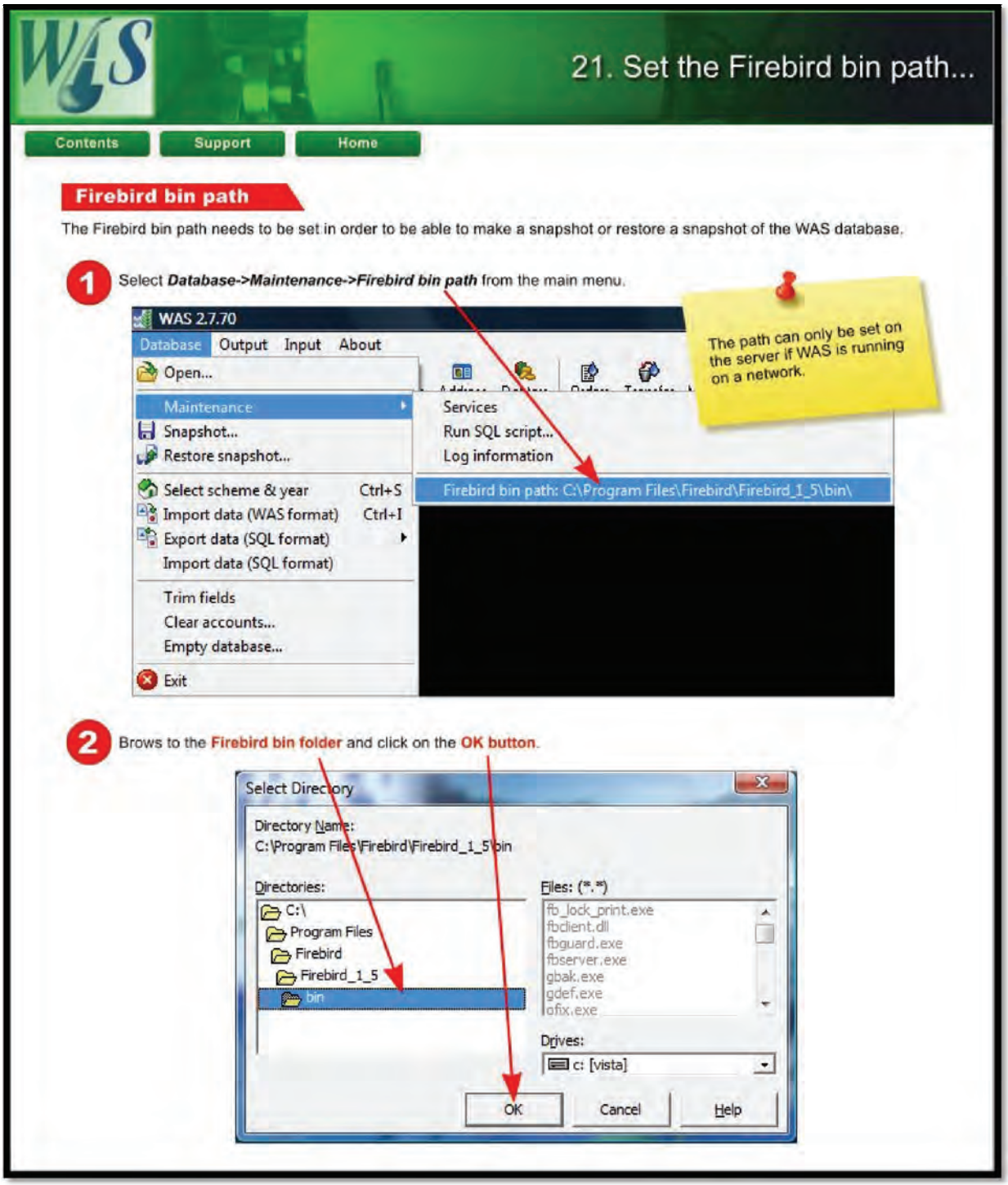


Figure 42 Set the Firebird bin path

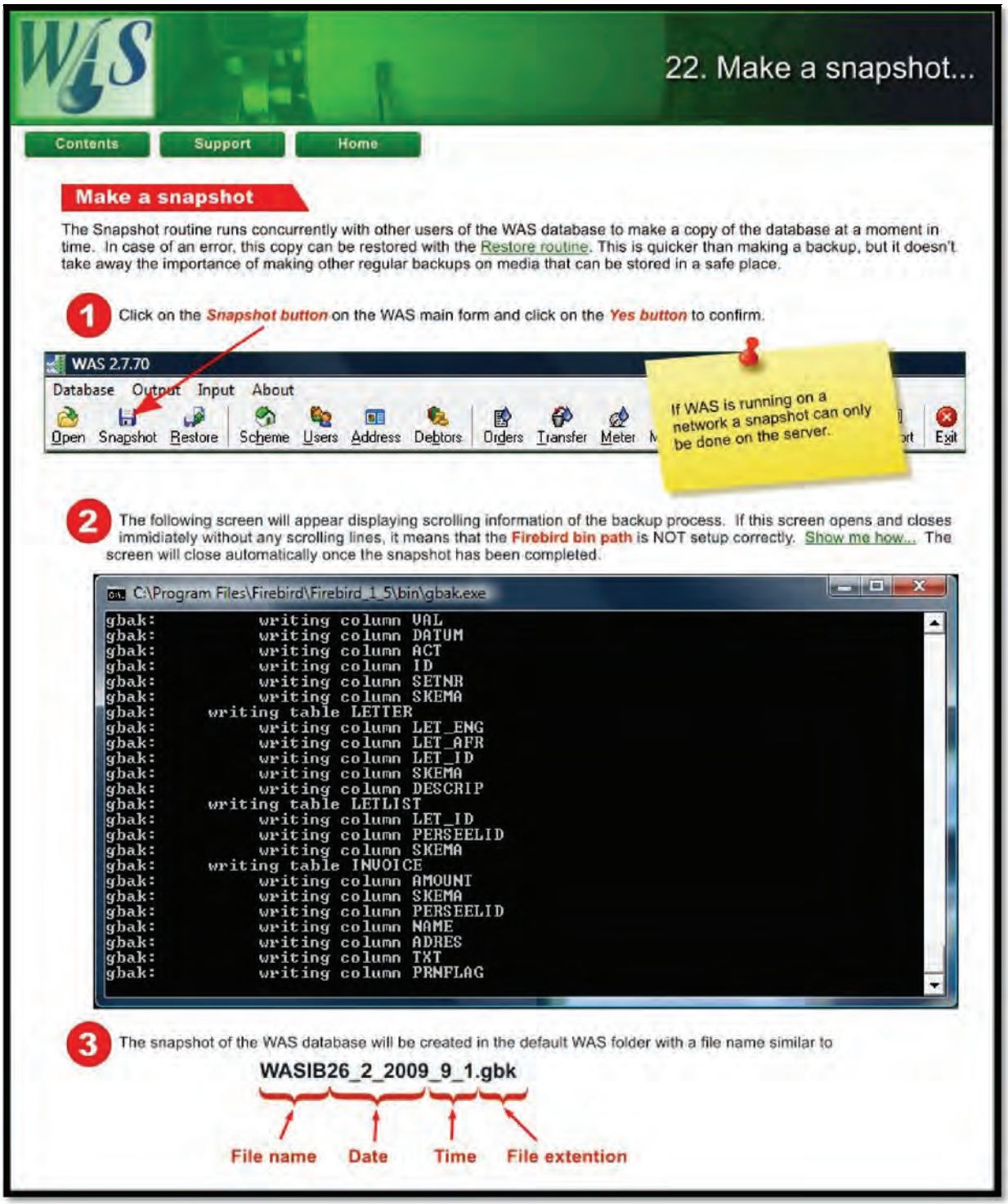


Figure 43 Make a snapshot

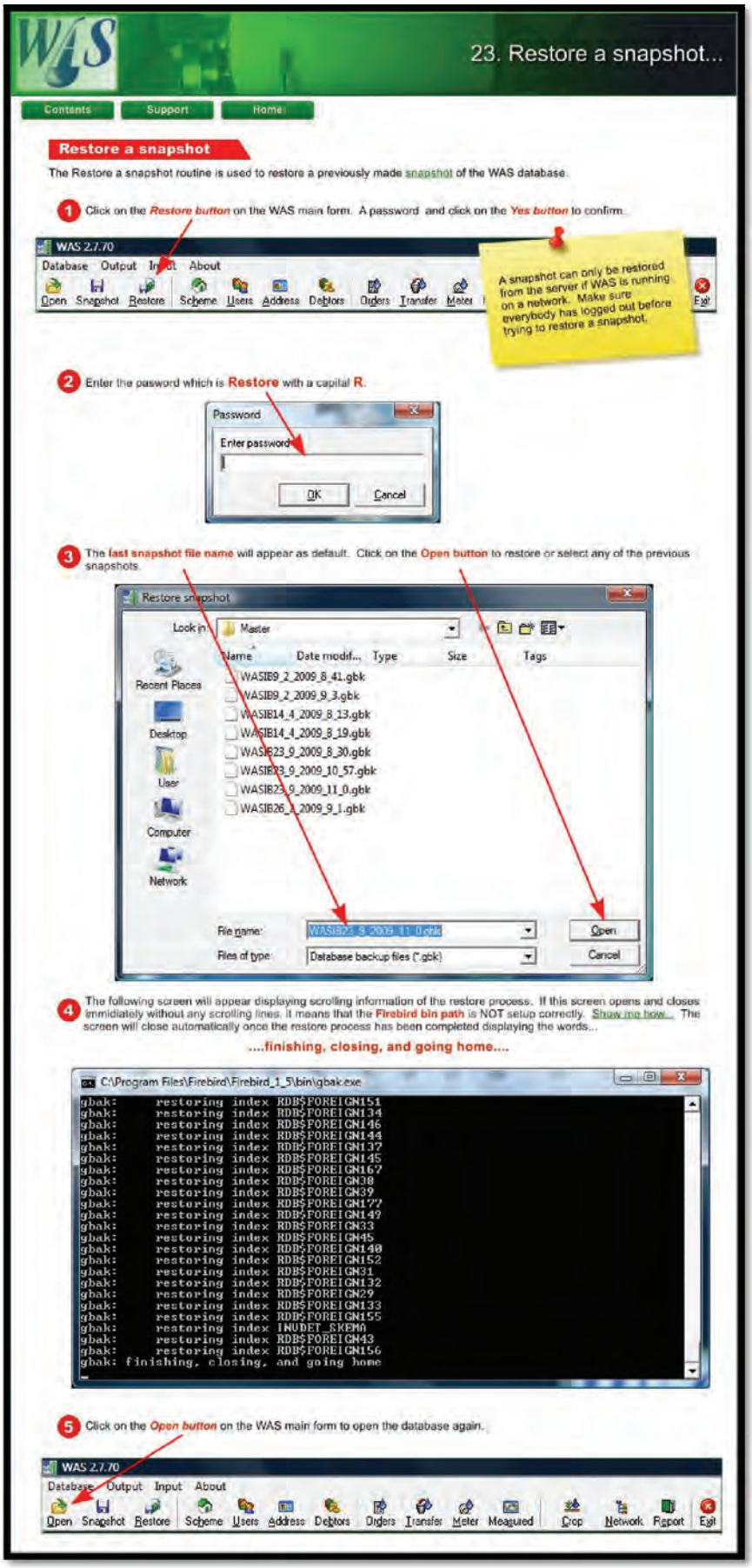


Figure 44 Restore a snapshot