Golf Irrigation Auditor Worksheets

14 pages to be submitted along with Audit Verification

7 pages for Fairway
7 pages for Green

AREA INSPECTION WORKSHEET #1
Fairway Data

Area Name _____ Date _____

Auditor _____ Sheet _____of_____

Controller Identification										
Station Number:										
Turfgrass Type										
Sprinkler Type										
Observed Problems:										
Valve Malfunctions										
Low Pressure										
High Pressure										
Tilted or Sunken Sprinklers										
Spray Deflection										
Rotation Speed										
Plugged Equipment										
Arc Misalignment										
Low Sprinkler Drainage										
Leaky Seals or Fittings										
Lateral or Drip Line Leaks										
Missing or Broken Heads										
Slow Drainage or Ponding										
Compaction/Thatch/Runoff										
Notes and Comments:										

AREA INSPECTION WORKSHEET #2
Fairway Controller Information

Area Name _____ Date _____

Controller ID _____ Sheet _____of_____

CONTROLLER DATA

Central Control	☐ Yes ☐ No
Make and Model Number	_____
Age	_____
Available Features:	
Number of Stations	_____
Minimum Run Time	_____
Maximum Run Time	_____
Percent Adjust Options	_____
Irrigation Days/Week Max.	_____
Irrigation Hours/Day Max.	_____
Calendar Period (days)	_____
Cycle Soak	_____
	_____
Sensors Installed	_____
	_____
	_____
Sensors Capability	_____
Miscellaneous Items:	_____

AREA INSPECTION WORKSHEET #3
Fairway Water Source Connection Information

PRESSURE DATA

Static pressure at Source _____psi Static Pressure at Test Area _____ Time of Day _____
Dynamic pressure at Source _____psi Dynamic Pressure at Test Area _____ Time of Day _____

Notes: Backflow Device, Pump Station, and Regulator

FLOW DATA

Meter or Pump Number	Station Number	Gal (cf)	Beginning Readings	Ending Readings	Beginning Time	Ending Time	Elapsed Time

CURRENT SCHEDULE/PROGRAM

Program	_____	_____	_____	_____	_____	_____	_____	_____
Cycles	_____	_____	_____	_____	_____	_____	_____	_____
Days	_____	_____	_____	_____	_____	_____	_____	_____

Program	Station	Run Time	Program	Station	Run Time	Program	Station	Run Time
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

PRECIPITATION RATE TEST WORKSHEET - FAIRWAY

Page: _____ of: _____ Date: _____ Auditor: _____

Site Name: _____ Sub Area: _____ File Name: _____

Plant Material: ☐ C/S Turf ☐ W/S Turf ☐ Grd. Cover ☐ Shrubs

Density Factor (K_d): ☐ High ☐ Avg. ☐ Low

Microclimate Factor (K_{mc}): ☐ High ☐ Avg. ☐ Low

Root Zone Depth: _____ in.

Soil Type: ☐ Clay ☐ Loam ☐ Sand ☐ _____ ☐ _____

Zone: ☐ Overlap ☐ Stand-Alone _____ Number of Catch Devices

☐ Valve-In-Head ☐ Block

Station Number		**Catch Device Volumes**					
Controller							
Testing Run Time							
Notes							
Pressure (psi)							
Spacings (feet)							

Test Area Map - Fairway

Date	Auditor	Site

DU AND PR CALCULATION WORKSHEET

Catchment Type: _____ Catchment Device Area (A_{CD}): _____ sq. in.

Can #1	_____	#13	_____	#25	_____	#37	_____	#49	_____	#61	_____
Can #2	_____	#14	_____	#26	_____	#38	_____	#50	_____	#62	_____
Can #3	_____	#15	_____	#27	_____	#39	_____	#51	_____	#63	_____
Can #4	_____	#16	_____	#28	_____	#40	_____	#52	_____	#64	_____
Can #5	_____	#17	_____	#29	_____	#41	_____	#53	_____	#65	_____
Can #6	_____	#18	_____	#30	_____	#42	_____	#54	_____	#66	_____
Can #7	_____	#19	_____	#31	_____	#43	_____	#55	_____	#67	_____
Can #8	_____	#20	_____	#32	_____	#44	_____	#56	_____	#68	_____
Can #9	_____	#21	_____	#33	_____	#45	_____	#57	_____	#69	_____
Can #10	_____	#22	_____	#34	_____	#46	_____	#58	_____	#70	_____
Can #11	_____	#23	_____	#35	_____	#47	_____	#59	_____	#71	_____
Can #12	_____	#24	_____	#36	_____	#48	_____	#60	_____	#72	_____
Subtotals	_____		_____		_____		_____		_____		_____

RUN TIME (t_R): _____ TOTAL CATCH: _____ mL

Calculating Distribution Uniformity (DU)

$$DU_{LQ} = \left(\frac{\text{Average Catch in Lower Quarter}}{\text{Average Catch Overall}} \right) \times 100$$

$$= \left(\frac{\_\_\_ \text{mL}}{\_\_\_\_ \text{mL}} \right) \times 100$$

$$= \_\_\_\_\_ \%$$

DISTRIBUTION UNIFORMITY (DU) = _____%

Calculating Precipitation Rate (PR)

$$PR_{net} = \frac{3.66 \times V_{avg}}{t_R \times A_{CD}}$$

$$= \frac{3.66 \times (\_\_\_\_ \text{mL})}{(\_\_\_ \text{min}) \times (\_\_\_ \text{in.}^2)}$$

$$= \_\_\_\_\_ \text{ in./h}$$

PRECIPITATION RATE (PR_{net}) = _____ in. / h

BASE SCHEDULE WORKSHEET - FAIRWAY

Golf Course:_____ Date:_____

Sub Area:_____ Controller:_____ Station:_____

ITEM	SOURCE		VALUE	UNIT or FUNCTION
I. Plant Water Requirement				
A. Plant Material	Audit			grass species
B. Reference Period	Judgment			days
C. Reference ET_o	Various sources			inches of water
D. Crop Coefficient (K_C)	Various sources			species factor
E. Microclimate Factor (K_{mc})	Judgment			factor
F. Plant Water Requirement (PWR)	K_C x K_{mc} x ET_o	C x D x E		inches of water
II. Sprinkler Performance				
G. Precipitation Rate (PR)	Audit			inches per hour
H. Distribution Uniformity (DU_{lq})	Audit			percent
III. Soil Reservoir				
I. Soil Type	Audit			classification
J. Infiltration Rate	Table			inches per hour
K. Available Water (AW)	Table			inches per inch
L. Root Zone (RZ)	Audit			inches
M. Plant Available Water (PAW)	AW x RZ	K x L		inches
N. Managed Allowable Depletion (MAD)	Judgment			percent in decimal
O. Allowable Depletion (AD)	PAW x (MAD/100)	M x N		inches
IV. Scheduling – Run Time				
P. Run Time Multiplier (RTM)	Table			factor
Q. Base Run Time (RT_b)	60 x (PWR/PR)	F/G x 60		minutes
R. Adjusted Run Time (RT)	RT_b x RTM	Q x P		minutes
S. Maximum Run Time per Cycle (CRT)	(I / PR) x 60	J/G x 60		minutes
V. Scheduling – Programming				
T. Irrigation Days per Period	PWR/AD	F / O		days (round up)
U. Minutes per Irrigation Day	RT/Irr. Days	R / T		minutes
V. Days Between Irrigation Events	Ref Period/Irr. Days	B / T		days (round down)
W. Number of Cycle Starts	Min per Day/Cycle RT	U / S		cycles (round up)
X. Minutes per Cycle	Min per Day/Cycle Starts	U / W		minutes (round down)

AREA INSPECTION WORKSHEET #1
Green Data

Area Name _____ Date _____

Auditor _____ Sheet _____of_____

Controller Identification										
Station Number:										
Turfgrass Type										
Sprinkler Type										
Observed Problems:										
Valve Malfunctions										
Low Pressure										
High Pressure										
Tilted or Sunken Sprinklers										
Spray Deflection										
Rotation Speed										
Plugged Equipment										
Arc Misalignment										
Low Sprinkler Drainage										
Leaky Seals or Fittings										
Lateral or Drip Line Leaks										
Missing or Broken Heads										
Slow Drainage or Ponding										
Compaction/Thatch/Runoff										
Notes and Comments:										

AREA INSPECTION WORKSHEET #2
Green Controller Information

Area Name _____ Date _____

Controller ID _____ Sheet _____of_____

CONTROLLER DATA

Central Control	☐ Yes ☐ No
Make and Model Number	_____
Age	_____
Available Features:	
Number of Stations	_____
Minimum Run Time	_____
Maximum Run Time	_____
Percent Adjust Options	_____
Irrigation Days/Week Max.	_____
Irrigation Hours/Day Max.	_____
Calendar Period (days)	_____
Cycle Soak	_____
	_____
Sensors Installed	_____
	_____
	_____
Sensors Capability	_____
Miscellaneous Items:	_____

AREA INSPECTION WORKSHEET #3
Green Water Source Connection Information

PRESSURE DATA

Static pressure at Source _____psi Static Pressure at Test Area _____ Time of Day _____
Dynamic pressure at Source _____psi Dynamic Pressure at Test Area _____ Time of Day _____

Notes: Backflow Device, Pump Station, and Regulator

FLOW DATA

Meter or Pump Number	Station Number	Gal (cf)	Beginning Readings	Ending Readings	Beginning Time	Ending Time	Elapsed Time

CURRENT SCHEDULE/PROGRAM

Program _____ _____ _____ _____ _____ _____ _____ _____
Cycles _____ _____ _____ _____ _____ _____ _____ _____
Days _____ _____ _____ _____ _____ _____ _____ _____

Program	Station	Run Time	Program	Station	Run Time	Program	Station	Run Time

PRECIPITATION RATE TEST WORKSHEET - GREEN

Page: _____ of: _____ Date: _____ Auditor: _____

Site Name: _____ Sub Area: _____ File Name: _____

Plant Material: ☐ C/S Turf ☐ W/S Turf ☐ Grd. Cover ☐ Shrubs

Density Factor (K_d): ☐ High ☐ Avg. ☐ Low

Microclimate Factor (K_{mc}): ☐ High ☐ Avg. ☐ Low

Root Zone Depth: _____ in.

Soil Type: ☐ Clay ☐ Loam ☐ Sand ☐ _____ ☐ _____

Zone: ☐ Overlap ☐ Stand-Alone _____ Number of Catch Devices

☐ Valve-In-Head ☐ Block

		Catch Device Volumes					
Station Number							
Controller							
Testing Run Time							
Notes							
Pressure (psi)							
Spacings (feet)							

Test Area Map - Green

Date	Auditor	Site

DU AND PR CALCULATION WORKSHEET GREEN

Catchment Type: _____ Catchment Device Area (A_{CD}): _____ sq. in.

Can #1 _____	#13 _____	#25 _____	#37 _____	#49 _____	#61 _____
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Can #3 _____	#15 _____	#27 _____	#39 _____	#51 _____	#63 _____
Can #4 _____	#16 _____	#28 _____	#40 _____	#52 _____	#64 _____
Can #5 _____	#17 _____	#29 _____	#41 _____	#53 _____	#65 _____
Can #6 _____	#18 _____	#30 _____	#42 _____	#54 _____	#66 _____
Can #7 _____	#19 _____	#31 _____	#43 _____	#55 _____	#67 _____
Can #8 _____	#20 _____	#32 _____	#44 _____	#56 _____	#68 _____
Can #9 _____	#21 _____	#33 _____	#45 _____	#57 _____	#69 _____
Can #10 _____	#22 _____	#34 _____	#46 _____	#58 _____	#70 _____
Can #11 _____	#23 _____	#35 _____	#47 _____	#59 _____	#71 _____
Can #12 _____	#24 _____	#36 _____	#48 _____	#60 _____	#72 _____
Subtotals _____	_____	_____	_____	_____	_____

RUN TIME (t_R): _____ TOTAL CATCH: _____ mL

Calculating Distribution Uniformity (DU)

$$DU_{LQ} = \left(\frac{\text{Average Catch in Lower Quarter}}{\text{Average Catch Overall}} \right) \times 100$$

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Calculating Precipitation Rate (PR)

$$PR_{net} = \frac{3.66 \times V_{avg}}{t_R \times A_{CD}}$$

$$= \frac{3.66 \times (\_\_\_\_\text{mL})}{(\_\_\_\text{min}) \times (\_\_\_\text{in.}^2)}$$

$$= \_\_\_\_\_ \text{ in./h}$$

PRECIPITATION RATE (PR_{net}) = _____ in. / h

BASE SCHEDULE WORKSHEET - GREEN

Golf Course:_____ Date:_____

Sub Area:_____ Controller:_____ Station:_____

ITEM	SOURCE		VALUE	UNIT or FUNCTION
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A. Plant Material	Audit			grass species
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II. Sprinkler Performance				
G. Precipitation Rate (PR)	Audit			inches per hour
H. Distribution Uniformity (DU_{lq})	Audit			percent
III. Soil Reservoir				
I. Soil Type	Audit			classification
J. Infiltration Rate	Table			inches per hour
K. Available Water (AW)	Table			inches per inch
L. Root Zone (RZ)	Audit			inches
M. Plant Available Water (PAW)	AW x RZ	K x L		inches
N. Managed Allowable Depletion (MAD)	Judgment			percent in decimal
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W. Number of Cycle Starts	Min per Day/Cycle RT	U / S		cycles (round up)
X. Minutes per Cycle	Min per Day/Cycle Starts	U / W		minutes (round down)