SUITE OF DSR FORMULAS TO BE APPLIED BY GOLF *Link* FROM 23 JANUARY 2014

(Version – August 2013)

How does DSR work? Does DSR take different factors into consideration than did CCR?

Under the new DSR system, GOLF Link will assess a current scratch rating each day for your course. This rating will be appropriate to the conditions you actually experienced. GOLF Link will do all of the work and the DSR value will be displayed on the club administrator's computer screen immediately after the scores are processed.

The formulas used to assess the DSR are complex as our statisticians have advised that simple formula options are not efficient enough to produce reliable ratings – this was the problem with CCR.

Through GOLF *Link*, the DSR system will establish each of the following:

- An average net score for the field.
- An average handicap for the field.
- The field size.
- The type of competition (Stableford, Par, or Stroke).
- The gender of the competitors.

Once it has established each of these factors, GOLF *Link* will compare the average net score it has calculated from the scores on the day, with the average net score it EXPECTS for this precise field composition. The EXPECTED average is determined by GOLF *Link* from millions of prior rounds. For greater accuracy, the averages above are weighted averages.

GOLF *Link* will then determine the DSR by using the difference between what happened on the day and what was EXPECTED to happen.

How is DSR different to the old CCR system? CCR simply lined-up all the net scores from best to worst and picked out the 12.5% score as the rating for that day. It took no account of the quality of the players in the field. It also used the statistically inefficient method of taking data from an extreme end of a range of values. It should be remembered though that CCR was designed in the pre-GOLF *Link* age and needed to be simple enough that all clubs could easily operate it. DSR is not hamstrung by the same considerations and GOLF *Link* will readily accommodate its complex formulae.

What are the DSR Formulas?

A DSR is calculated for a defined group of golfers. For example the group may be all golfers at a club playing on a given day, or playing in an AM competition.

For each player in the group, GOLF *Link* will calculate the Normal Deduction (ND) and the appropriate Weight (W) to be given to the player's score.

Player's Normal Deduction: ND = mh+b,

where h is the player's played off handicap, m and b are taken from the table below, representing the slope and intercept of the straight line of best fit.

	Men		Women	
	m	**b**	**m**	**b**
Par	0.052	2.777	0.062	2.514
Stableford	0.111	3.498	0.117	3.338
Stroke	0.124	4.372	0.146	3.939

Player's Weighting Factor: $W = 1/(m'h+b')^2$,

where m' and b' are taken from the table below representing the slope and intercept of the straight line of best fit for the empirically derived standard deviation of the player's score.

	Men		Women	
	m'	**b'**	**m'**	**b'**
Par	0.025	2.824	0.030	2.653
Stableford	0.060	3.545	0.060	3.478
Stroke	0.086	3.715	0.084	3.609

For each player in the group, GOLF *Link* will then calculate the Player Condition Estimate (PCE)

Player Condition Estimate: PCE = (36+Par-SR-CPA-ND) - S = (36+Par-SR-CPA-mh-b-S),

where S is the player's actual Stableford points scored, and

CPA (Course Parameter Adjustment) = Prior CPA + Prior WCA x 0.02 x (0.7 for Men, 0.5 for Women).

WCA is defined below. Prior WCA is the value of WCA from the most recent group at that club prior to the current one. The first time the formulae are used for a Club, the Prior CPA and Prior WCA are zero.

GOLF *Link* then computes weighted averages for the whole group, with the intermediate variables Group Weight and Weighted Condition Adjustment (WCA) leading to the final DSR.

Group Weight $= SUM(W) + 1/CSD^2 = SUM(1/(m'h+b')^2) + 1/CSD^2$

where CSD (the Course Standard Deviation) is estimated at 1.5.

Weighted Condition Adjustment: WCA = SUM{PCE x W} / (Group Weight)

DSR = SR + WCA

THE ABOVE CAN BE EXPRESSED IN A SINGLE FORMULA AS FOLLOWS:

$DSR = SR + SUM\{(36+Par-SR-CPA-mh-b-S)/(m'h+b')^2\} / \{SUM(1/(m'h+b')^2) + 1/CSD^2\}$