APPENDIX B - PROTOCOLS AND PROCEDURES

Procedure for IBD Approval

1. Criteria for IBD Provisional Approval

- Candidates for Provisional Approval will be selected from those varieties in UK Recommended List trials with promising NL1 and NL2 micromalting results.

- Provisional Approval 1 will be awarded to those varieties that demonstrate useful malting quality in micromalting tests following the first Recommended List trial harvest.

- For winter varieties only, Provisional Stage 1 Approval will be given after RL1 where the data are strong with borderline varieties being assessed a year later using additional data from the RL2 harvest. Once a decision has been made to delay consideration for Approval the variety will only be considered at its due date.

- Varieties entering the UK system via the EU Common Catalogue will be eligible for Provisional Approval once the Working Parties are satisfied that sufficient comparable data on UK grown barley is available, and that the micromalting or commercial performance demonstrates useful quality.

2. Criteria for IBD Full Approval

- Candidates for Full Approval will normally have been awarded Provisional Approval 1 based on micromalting results. To gain Full Approval, the Malting Barley Committee must have evidence of satisfactory commercial performance in the maltings/brewery/distillery. Each year a maximum of 5 varieties will be chosen for commercial scale trials, no more than 2 of which will be Winter varieties.
  A minimum of 1000 tonnes of barley needs to be made available per test in order for sufficient trials to be carried out to enable a variety to proceed from Provisional Approval 1 to Full Approval in a single crop year. If a variety is to be trialled for both brewing and distilling then a minimum of 2000 tonnes would be required.

- Wherever possible the barley available for testing should have nitrogen content of:
  Brewing 1.55 – 1.75%
  Distilling maximum 1.65%
  Grain distilling minimum 1.85%

- In order to ensure a variety has the best opportunity of gaining Full Approval within the required timescale trial barley should be in store and dried by the end of September. This will then enable maltsters to complete their trials by the end of January and Brewers/Distillers to complete the trials by the beginning of May.

- Multiple trial data from individual brewers/distillers may be admissible providing each trial is performed through a different process system (i.e. mash tun, lauter tun or mash filter).

- It is preferable that a spring barley variety should be tested against another spring barley and likewise with a winter variety.

- Satisfactory micromalting results should be confirmed by a minimum number of satisfactory macro trials.

Macro Trials:

For Full Approval for Brewing Use

2 commercial malting and 2 different brewing trials (from a choice of lauter tun, mash tun and mash filter)

For Full Approval for Distilling Use

2 commercial malting and distilling trials

For Full Approval for Grain Distilling Use

2 high DP commercial malting trials plus 1 acceptable test report by SWRI

- A variety should normally progress to Full Approval with one year of commercial trials. Where there have been insufficient satisfactory malting, brewing or distilling trials to award Full Approval in one year of commercial trials, the Malting Barley Committee may award Provisional Approval 2 to denote that a variety has not been rejected and is still progressing through the approval process.

- A variety should progress to Full Approval within two years of commercial trials. Any variety failing to gain Full Approval within two years will be removed from the List.

- The Malting Barley Committee may consider for Provisional and Full Approval varieties with special qualities providing that they demonstrate satisfactory (but not necessarily the best) malting and brewing/distilling performance in all respects.

- The Malting Barley Committee may use its absolute discretion with regard to awarding of Approval, which might under circumstances override the above criteria.

3. Criteria for Removal from the List of IBD Approved Varieties

- Varieties may be removed from the List of IBD Approved or Provisionally Approved Varieties when, at the discretion of the Malting Barley Committee, the Approved or Provisionally Approved variety no longer warrants promotion by the industry.

- Criteria from removal may include insufficient commercial scale trials, poor or outclassed performance, low purchases or lack of seed availability.

English Micromalting Group (EMMG)

Experimental Procedure for Barley and Malt Samples

Analytica-EBC Recommended Methods
These methods (quoted in brackets after each analysis)

1. Barley Analysis

1. Distribution to collaborators is usually in December/ January.
2. When received, a sample of each batch of barley should first be analysed for corn size distribution, using a barley grader (Glasblaserei), having slotted sieves of 2.8mm, 2.5mm and 2.2 mm.

Please record the results as:

Corns >2.8mm (%) = weight of grain retained on 2.8 mm sieve
Corns <2.5mm (%) = weight of all grain that passes through 2.5mm sieve (i.e. includes that which will also pass through 2.2 mm)
Corns <2.2mm (%) = weight of all grain that passes through 2.2mm sieve

3. The complete sample should then be dressed over the 2.2mm sieve and all barley <2.2mm discarded. A visual examination of the screened barley should also be recorded (splits, loose husk, lost embryos, mould etc). N.B. Where possible barleys should be stored at 20°C prior to malting.
4. Barley should be analysed for:

Moisture (3.2), Thousand Corn Weight (), Germinative Capacity (),

Germinative Energy and Water Sensitivity () and Total Nitrogen (3.3.2 Dumas).

N.B. All germination plate tests to be made just prior to malting and recorded as cumulative counts at 72h.

2. Micromalting

1. Steeping.

The grain should be steeped to moisture content of 44 - 46%, measured 24h from casting. **A two or three steep regime should be used** to achieve this moisture and temperature may be in the range 12 - 20^{o}C. Up to 48h is allowed for steeping. Sufficient grain should be steeped to allow full malt analysis to be carried out.

2. Germination

A nominal 96h is to be employed and no processing aids used.
Total wet processing time (i.e. steep time + germination time) is not to exceed 144h.

The normal temperature for the particular Micromalting system should be used.

Both cast moisture (24h after steeping) and kiln load moisture should be recorded.

3. Kilning

The malt should be dried to 4 - 5% moisture at a maximum temperature of 65°C.

3. Malt Analysis

Each collaborator should then carry out analysis by IOB MASH for:

(i) HWE_7 (4.6)

(iii) Colour (4.7.2)

(iv) DP (4.12)

(v) DU (4.13)

(vi) TN (4.3.2 Dumas)

(vii) TSN (4.9.3 Dumas)

(viii) SNR

(ix) FAN (4.10)

(x) Wort viscosity (4.8)

(xi) Fermentability **ON BOILED WORT** **(4.11)**

(xii) Friability/Homogeneity (4.15)

(xiii) Wort β-glucan (4.16.2)

(xiv) Glassy corns

(Results should be reported on the basis of 450g mash where applicable.)

4. Expression of IOB Results

Please express malt analyses as follows:

Moisture (%)	To one decimal place
HWE_7 (litre°kg^{-1})	DRY to nearest whole number
Colour (EBC)	To one decimal place
TSN (%)	DRY to two decimal places
TN (%)	DRY to two decimal places
SNR (%)	To nearest whole number
FAN (mg $l^{-1)}$	AS IS to nearest whole number
Fermentability (%)	REAL to nearest whole number
Viscosity (mPa.s)	To two decimal places
Friability (%)	To nearest whole number
Homogeneity (%)	To nearest whole number
DP (°IOB)	AS IS to nearest whole number
DU (-)	DRY to nearest whole number
B- Glucan (mg l^{-1})	AS IS to nearest whole number

Glassy corns (%)	To one decimal place

Scottish Micromalting Group (SMMG)

Protocol for Barley and Micromalt Testing

Recommended List and National List Trials

Sample Reception and Barley Analysis

- All samples are identified by the AFP Number.
- On arrival 100g of sample is used to measure the percentage corns >2.8mm, <2.5mm and <2.2mm.

  Corns >2.8mm (%) = weight of grain retained on 2.8 mm sieve
  Corns <2.5mm (%) = weight of all grain that passes through 2.5 mm sieve
  (i.e. includes that which will also pass through 2.2 mm)
  Corns <2.2mm (%) = weight of all grain that passes through 2.2 mm sieve

- The sample should be screened over a 2.2mm sieve and used for barley analysis and micromalting.
  .

Reporting of Results

- Results may be recorded directly on the electronic data sheets provided, or recorded on a paper hard copy and then typed into the electronic data sheets.
- Use a separate spreadsheet for each trial
- Record your company and barley trial (eg NL1 Spring) on each spreadsheet.
- Record all data by AFP number and in AFP numerical order with controls at the top of the list.
- Use IoB Recommended Methods of Analysis wherever possible.
- Data must be reported electronically via e-mail to the RL & Agronomy Trials Data Analyst and to Chairman of the SMMG (alan.brown@bairds-malt.co.uk)

Barley Analysis

- It will save you work if the barley analysis is carried out after HGCA have reduced the number of NL1 and NL2 entries (i.e. in November/December). A Brown & Bill Handley to distribute these lists ASAP.
- Only varieties identified as non-producers of GN will be tested by the SMMG
- Use the sample screened over 2.2mm.
- Carry out the following analyses:

  Moisture
  1000 Corn Weight (g)
  Total Nitrogen (dry base)
  % Split or damaged corns. If damage is apparent, try to assess this quantitatively.
  % Skinning
  Pre-germination (record this only if entries are obviously pregerminated)

- Before micromalting, carry out a Germinative Capacity Test (Peroxide) and Germinative Energy / Water sensitivity test (4ml and 8ml) on the trial and control samples.

Dormancy Testing

- Storage and dormancy monitoring will be conducted by the NIAB
- Dormancy Testing to be done only on NL barleys
- The data is to be forwarded to the Chairman of the SMMG as soon as they are complete.

Micromalting

- After taking a sub sample for barley analysis, store the remaining screened (2.2mm) sample at 20-25°C to promote dormancy recovery.
- The HGCA will issue updated lists detailing which varieties from the NL trials need micromalting.
- Just prior (ca one week) to micromalting, carry out Peroxide Germinative Capacity and 4ml and 8ml Germinative Energy tests.
- Record these germination counts on the SMMG BARLEY & MICROMALTING SPREADSHEET.
- If a sample shows persistant dormancy (< 90%) it may be micromalted but the results may be excluded from the mean figures in the data base.
- Screen barley over 2.2mm and record the sample moisture content.
- If possible steep all the trial samples in a single micromalting run. If this is not possible, ensure that micromalting conditions do not vary from run to run.
- Do not attempt to optimise micromalting conditions for each variety.
- Each variety shall receive the same steeping, germination and kilning cycles.
- Process cycles should reflect commercial practice.
- A two or three wet stand steep cycle may be used. Steep additives including Gibberrellic Acid should be avoided.
- Record the "cast moisture" a suitable time after the last steep. Typical target cast moistures are:
    - distilling malt 45-46 %
    - high enzyme malt >48%
- Record steep cycle and conditions.
- Ideally varieties will be be sprayed to the same moisture content after casting from steep. Record the moisture after spraying.
- Where possible ensure that all varieties keep similar moistures during germination.
- For pot still malts kiln at 60-70°C as per a lager or distilling malt. The final moisture should be 3.5 –5.0%, target 4.0 – 4.5%.
- For high enzyme malts kiln at 50-55°C as per a grain distilling malt type. The final moisture should be 5.5 – 7.0%, target 6.0 – 6.5%.
- Record processing conditions on the SMMG MICROMALTING REPORT SHEET.
- Additional comments may be made eg grain mouldy, uneven growth etc.

Malt Analysis

- Where appropriate, use IBD Recommended Methods of Analysis.
- SMMG members are expected to take part in the MAPS proficiency scheme and are responsible for their own laboratory precision.
- Please record all data listed in the SMMG MICROMALTING REPORT SHEET.
- GN testing regime is detailed as follows:

Testing regime for Pot Still Distilling Malts:

- GN analysis <u>is not required</u> on the non-producers at NL1

- GN analysis is required on non-producers at NL2
- GN analysis is optional on varieties at RL
- GN analysis is not required on material from the High N grain distilling trials