There are two parts:

- **Map Printing & Course Marking, March 2020**
  Presented at a Course Planning Workshop in Adelaide

- **Some slides from the Oceania Mapping Workshop, 2019**
  As Member, IOF Map Commission
  Slides with relevance for Level 3 Controllers workshop

Map Printing & Course Marking

- **Printing and colour**
- **Course markings**
- **Mapping in general**

Overview in respect to map printing

Note. This presentation does not cover:

- **Mapping specifications**

  ISOM 2017.2

  ISSprOM 2019

  ISSkiOM 2019

  ISMTBOM

- **Control process of the mapping for major IOF Events**

  – a map check by the Map Commission in respect to compliance with map specifications, map legibility and minimum gaps, lengths and areas

- **Checklist for controlling the map making for major IOF Events**
- **Register of print shops for printing maps for major IOF Events**

- **For these refer to the IOF Mapping pages at:**
  https://orienteering.sport/iof/mapping/

Printing and colour

Map printing over the last 25 years has completely changed

- Maps once printed using 5 spot colours (defined by PMS) using an offset printer and then courses ‘overprinted’ using Purple
- Today maps and courses are drawn on a computer (RBG screen) and mostly reproduced on a laser printer using the CMYK colour system

Printing and colour requirements of an orienteering map is now described in a separate document:

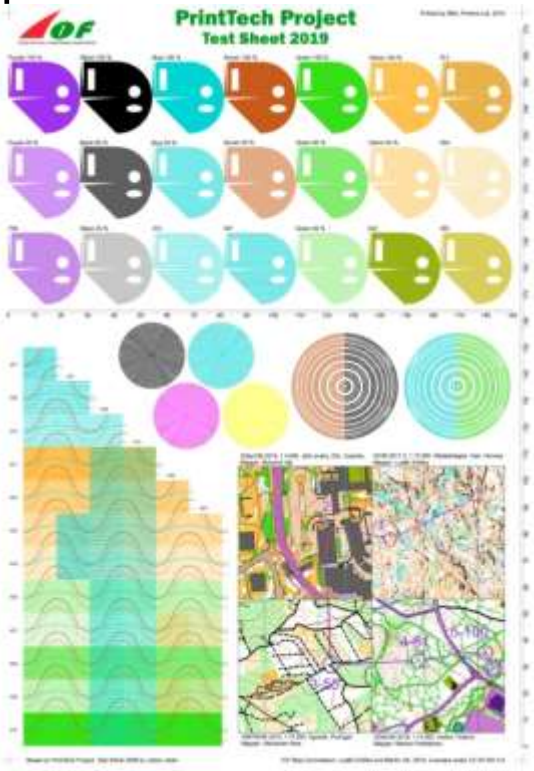
ISOM 2017 Appendix 1 – CMYK Printing and Colour Definitions including colour order and definitions for ISSprOM (chapter 7)

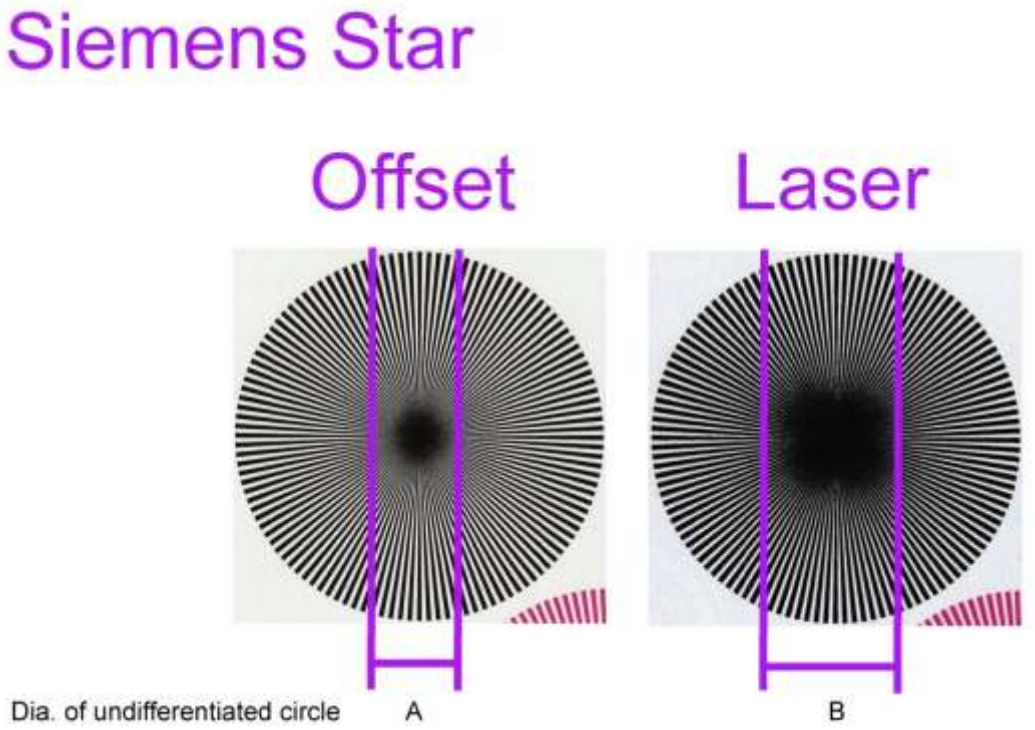
Version 3, 2019-11-08

Printing and colour

Quality control using the PrintTech IOF Test Sheet 2019

- Colour matching to the IOF spot colour, offset printed test sheet
- Print quality ie sharpness of lines and edges, compared to the IOF laser printed test sheet





Printing and colour

Colour order in mapping software

- The order of printing colours are set for each mapping specification ie forest, sprint, ski, mountain bike
- Colour order is becoming more complex ie point feature and area feature of the same colour may have two positions on the colour table
- Do not mess with the colour order!

Paper

- Laser printing requires good quality white paper for colour laser printing with a weight of 100 – 110gms per square meter

  Plastic bag thickness ~ 100 microns
- Plastic paper to have a smooth surface and suitable folding capability

Printing and colour

Course planning symbols

- Courses were once ‘Overprinted’ with Purple which appeared transparent over the map.

- Laser printing requires the transparent effect to be simulated by placing the Purple track colour below certain map colours as per colour order for orienteering maps.
  - More advanced methods to achieve overprint such as ‘Blending’ is not recommended because this can impede the effort to print a map with high resolution and also can create confusing other colours due to the overlapping of colours.
  - Currently only OCAD can simulate transparency of placing the

  Purple track colour under certain map colours. It requires the map file to be merged with the Course file.

Printing and colour

Colour order

ISSOM 2017.2

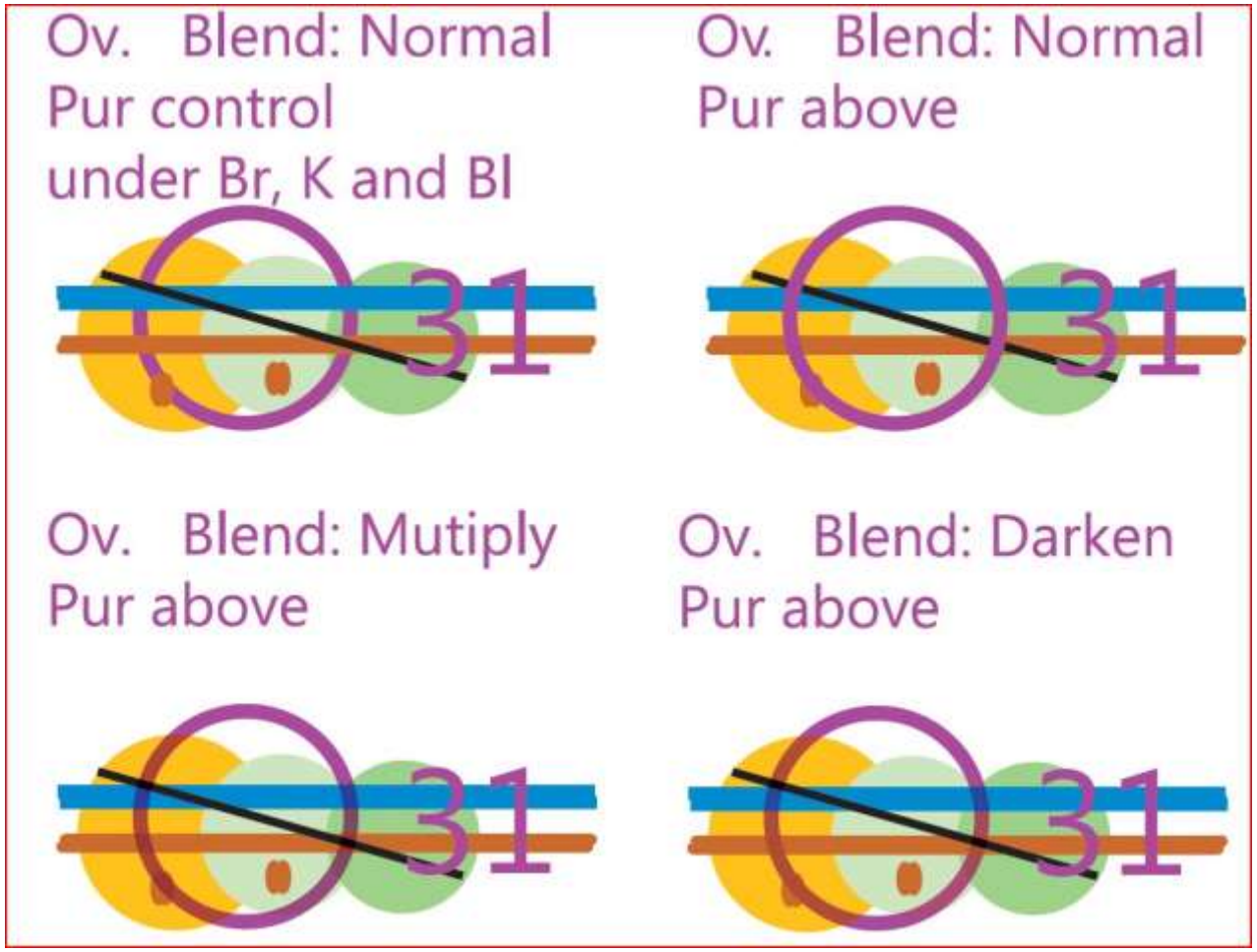
- Purple
- White (rub out all)
- Black (except 100% black for big buildings)
- Blue 100% lines and point symbols
- Brown 100%
- Purple (course setting)
- Road infill (brown 50%)
- Road outlines (black 100%)
- Blue 100% (areas, marshes,)
- Blue 70%
- Blue 50%
- Brown 50%
- Green 50%+yellow 100%
- Green 100%
- Green 60%
- Green 30%
- Black 25%
- Black 20%
- Yellow 100%
- Yellow 50%

ISSprOM 2019

- Purple 100% (all course planning symbols exept 701, 703, 705, 706, 708, 710,1)
- White (Background to control descriptions and white shade for control numbers)
- Black 100%
- Green 100% (point symbols)
- Purple 100% (course planning symbols mentioned above)
- Purple 50%
- Blue 100%
- Brown 100%
- Black 60% (buildings)
- Black 50% (tramway)
- Black 20% (canopy)
- Blue 70%
- Blue 30%
- Brown 50%
- Brown 30%
- Green 50%+yellow 100%
- Green 100% (reference shade 86_0_91_0)
- Green 60%
- Green 30%
- Black 30% (bare rock)
- Yellow 100%
- Yellow 50%

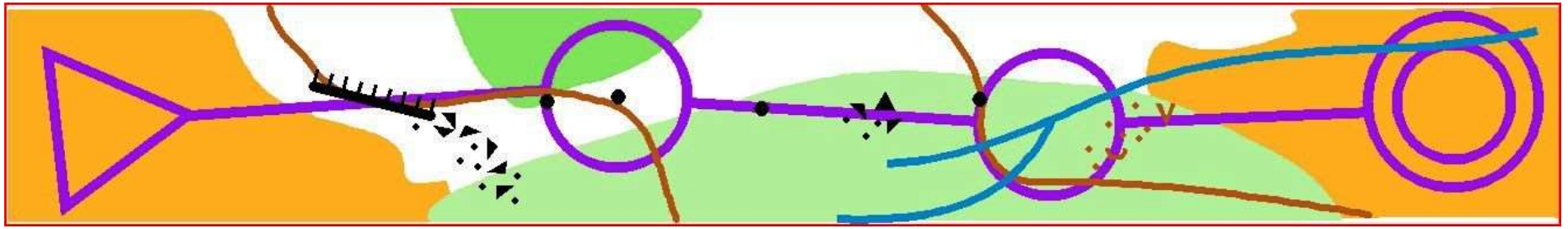
Printing and colour

Course printing: Comparison of Under, On top and Blending

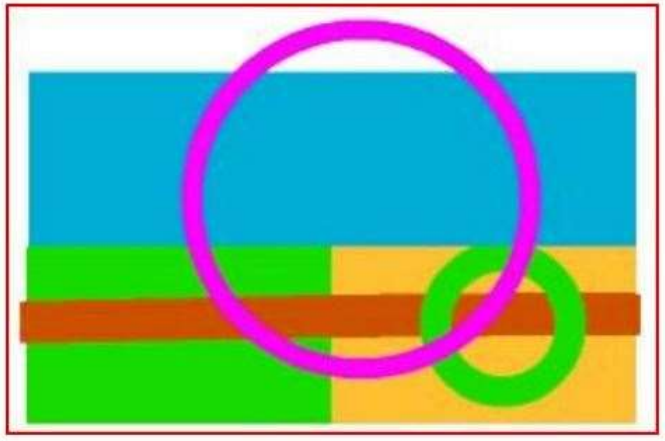


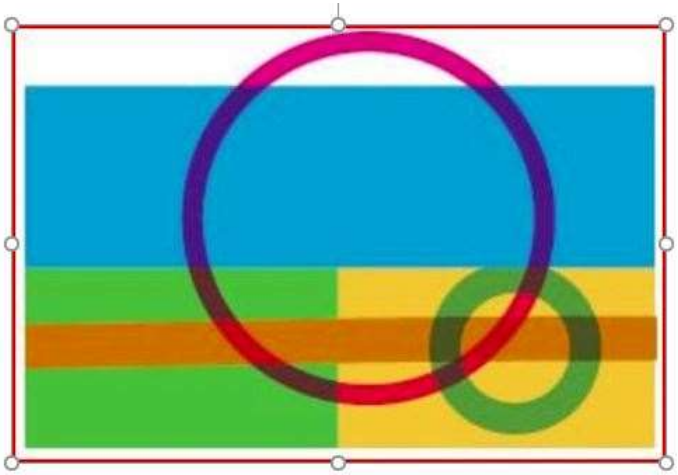
Printing and colour

Even with simulation best to cut connection lines and control circles as required. Example shows Purple under Black, Brown and Blue



Blending creates confusing third colours

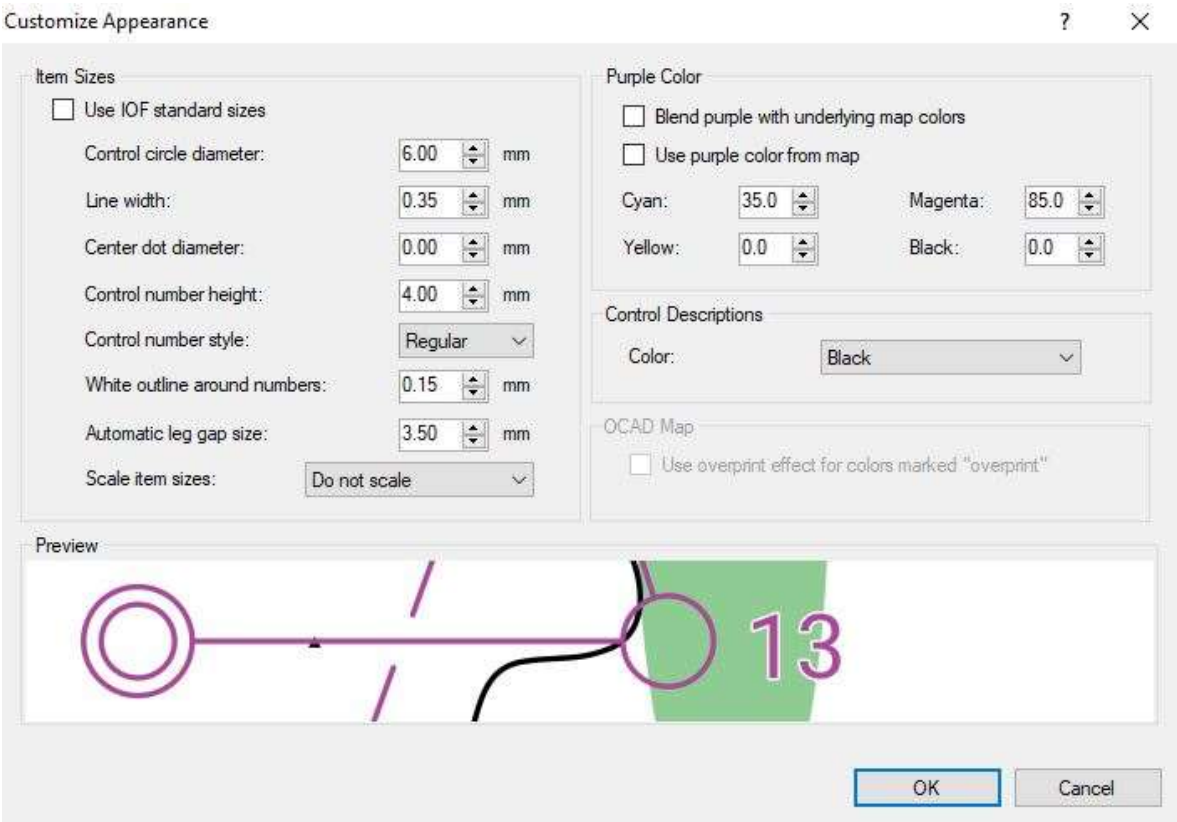




Printing and colour

Purple Pen course marking set up

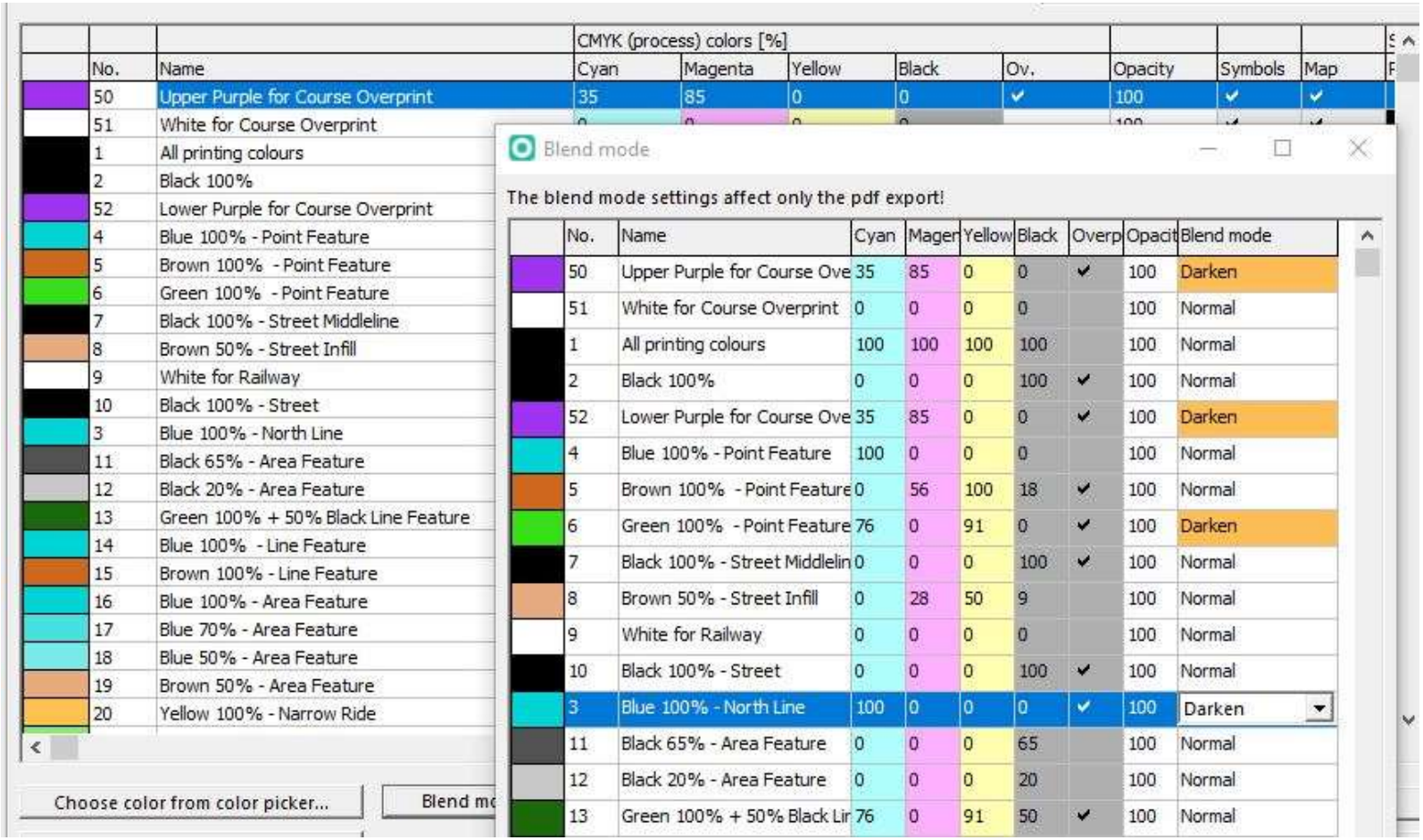
- Purple CMYK 35 85 00 00
- Blending unchecked ie blank
- White outline to numbers
- Control circle diameter:
  5mm ISOM (1:15,000)
  6mm ISSprOM (1:4,000)



Printing and colour

OCAD course marking set up

- Change Blend mode to Normal for all colours (for PDF export)



	No.	Name	CMYK (process) colors [%] Cyan	Magenta	Yellow	Black	Ov.	Opacity	Symbols	Map
	50	Upper Purple for Course Overprint	35	85	0	0	✔	100	✔	✔
	51	White for Course Overprint								
	1	All printing colours								
	2	Black 100%								
	52	Lower Purple for Course Overprint								
	4	Blue 100% - Point Feature								
	5	Brown 100% - Point Feature								
	6	Green 100% - Point Feature								
	7	Black 100% - Street Middleline								
	8	Brown 50% - Street Infill								
	9	White for Railway								
	10	Black 100% - Street								
	3	Blue 100% - North Line								
	11	Black 65% - Area Feature								
	12	Black 20% - Area Feature								
	13	Green 100% + 50% Black Line Feature								
	14	Blue 100% - Line Feature								
	15	Brown 100% - Line Feature								
	16	Blue 100% - Area Feature								
	17	Blue 70% - Area Feature								
	18	Blue 50% - Area Feature								
	19	Brown 50% - Area Feature								
	20	Yellow 100% - Narrow Ride								

Choose color from color picker...

Blend mode

The blend mode settings affect only the pdf export!

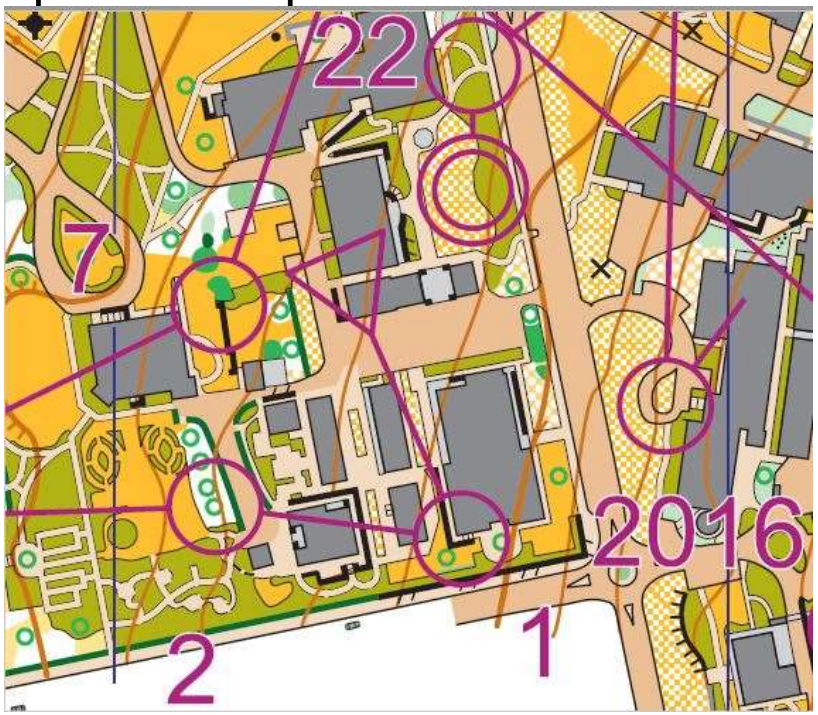
	No.	Name	Cyan	Mager	Yellow	Black	Overp	Opacit	Blend mode
	50	Upper Purple for Course Ove	35	85	0	0	✔	100	Darken
	51	White for Course Overprint	0	0	0	0		100	Normal
	1	All printing colours	100	100	100	100		100	Normal
	2	Black 100%	0	0	0	100	✔	100	Normal
	52	Lower Purple for Course Ove	35	85	0	0	✔	100	Darken
	4	Blue 100% - Point Feature	100	0	0	0		100	Normal
	5	Brown 100% - Point Feature	0	56	100	18	✔	100	Normal
	6	Green 100% - Point Feature	76	0	91	0	✔	100	Darken
	7	Black 100% - Street Middlelin	0	0	0	100	✔	100	Normal
	8	Brown 50% - Street Infill	0	28	50	9		100	Normal
	9	White for Railway	0	0	0	0		100	Normal
	10	Black 100% - Street	0	0	0	100	✔	100	Normal
	3	Blue 100% - North Line	100	0	0	0	✔	100	Darken
	11	Black 65% - Area Feature	0	0	0	65		100	Normal
	12	Black 20% - Area Feature	0	0	0	20		100	Normal
	13	Green 100% + 50% Black Lir	76	0	91	50	✔	100	Normal

Printing and colour

Creating PDF files in OCAD

- LHS File > Export > PDF
- RHS Course setting > Print > Courses > Microsoft Print to PDF (can also do this in PurplePen)

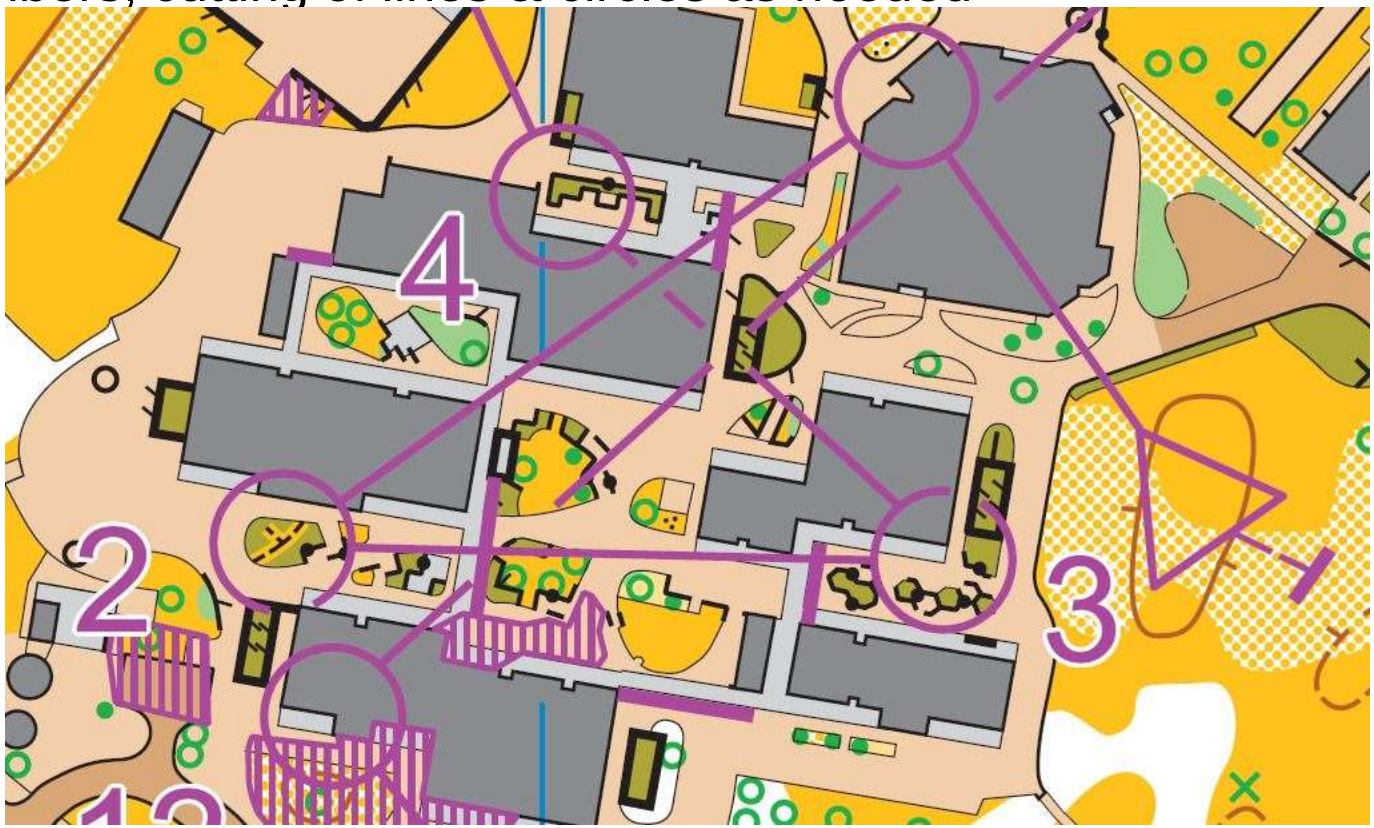
NOTE: These images are in RBG so the final decision must be based on the printed map which uses CMYK



Printing and colour

Example: Aust Sprint Champs, Renmark Schools 2018

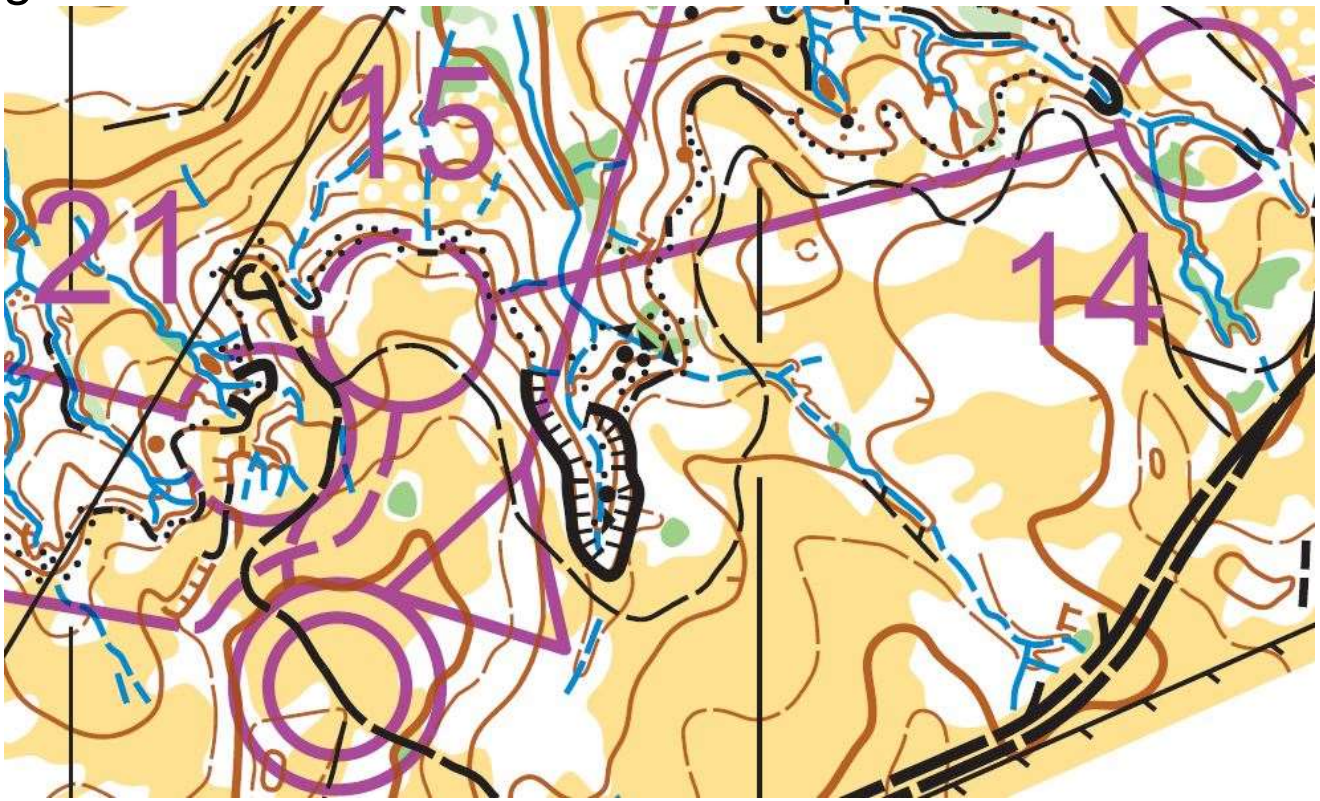
- OCAD: No blending, Purple on top of all colours, White border to control numbers, cutting of lines & circles as needed



Printing and colour

Example: Aust Relay Champs at Wiela / Bunyip Reach 2018

- OCAD Blending ‘on’ for lines & circles. No attempt to cut connection lines as too many leg variations
- OCAD Blending ‘off’ for control numbers and on top of all colours

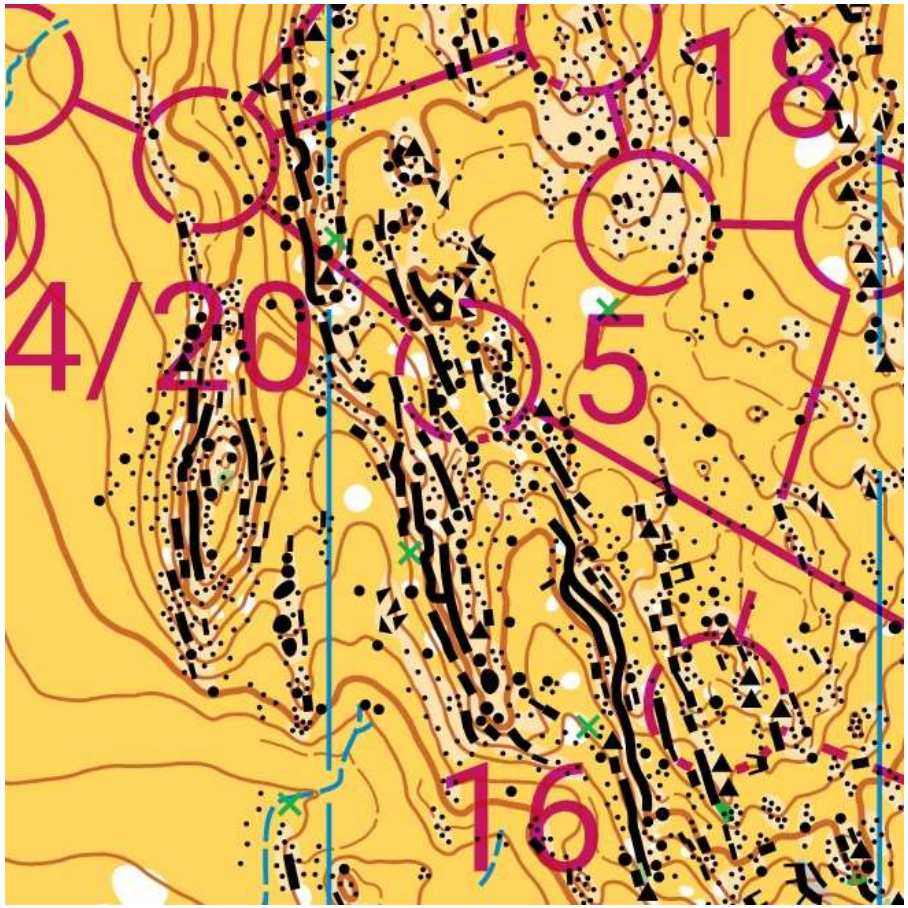


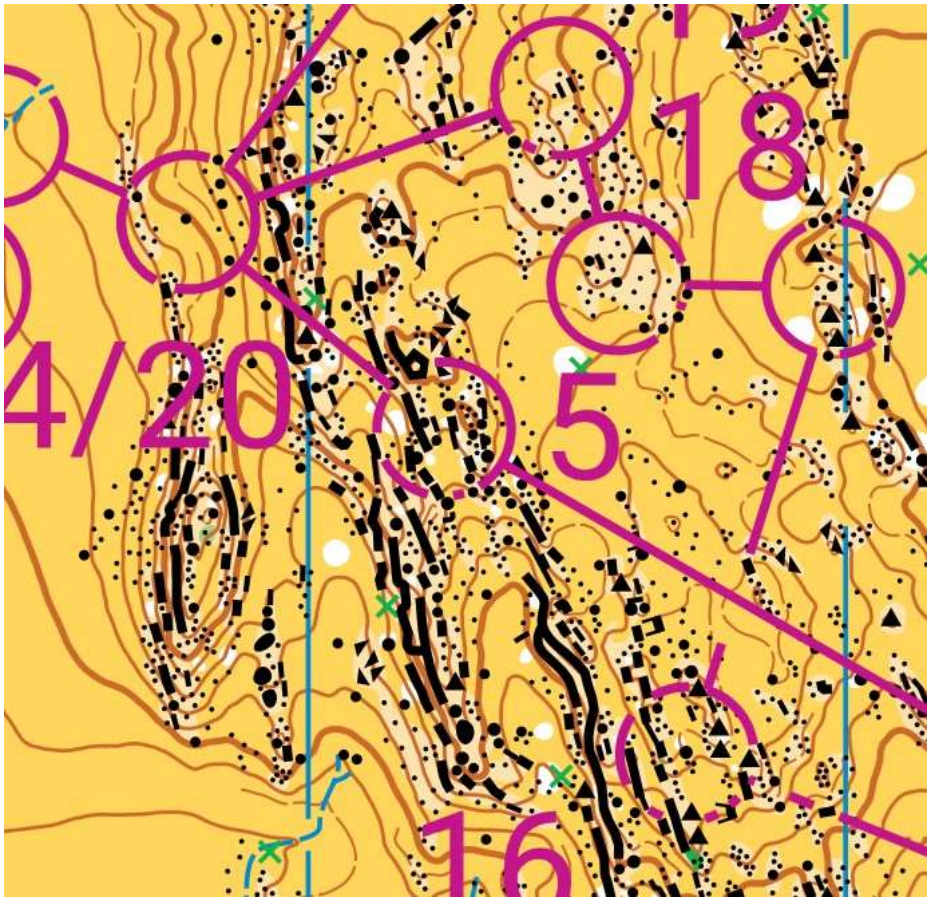
Printing and colour

Example: Aust Middle Distance Champs at Keynes Gap 2018

Purple Pen: LHS Blending ‘On’ RHS Blending ‘Off’

Controller and Course Planner were given this choice – so which one?





Printing and colour

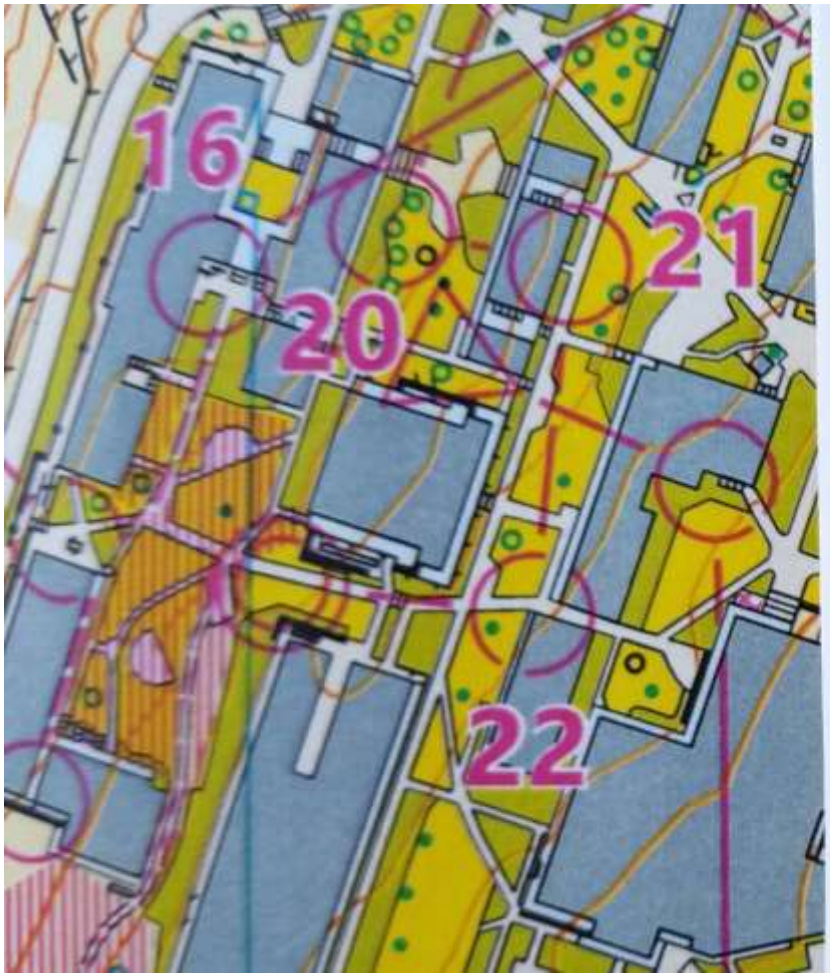
Print quality: Wagga Wagga University

LHS Aust Sprint Champs 2019 - a fail! RHS Aust 3 Day 2017

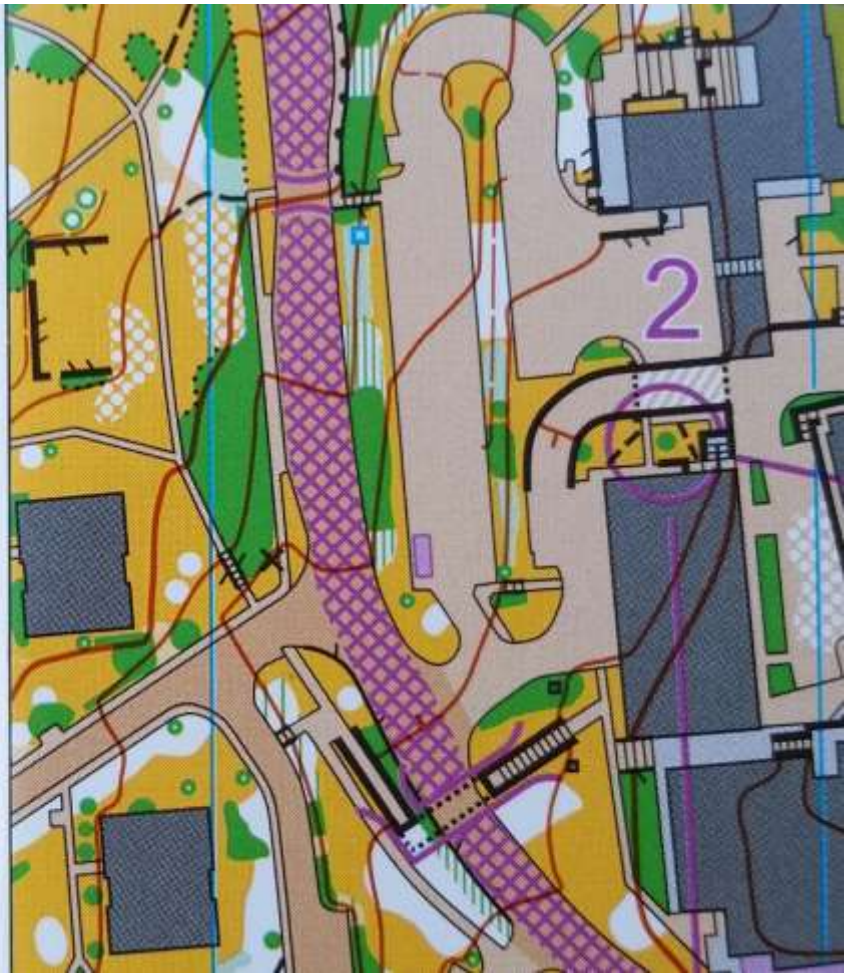
Printing and colour

Print quality: Wagga Wagga University

Aust Sprint Champs 2019 – a fail!



IOF Print Tech Sheet



Printing and colour

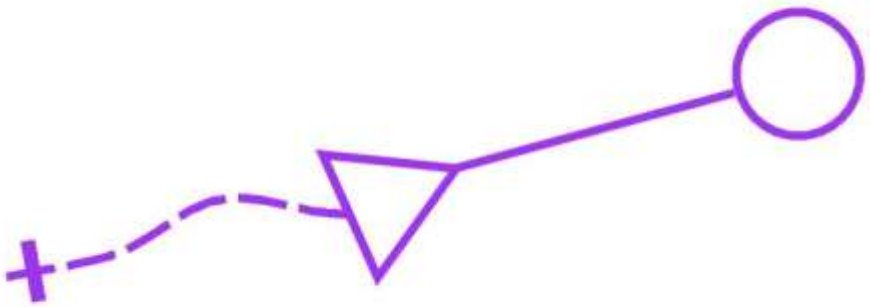
THE CONTROLLER IS RESPONSIBLE FOR ENSURING THE PRINTED MAP MEETS MAPPING SPECIFICATIONS

- Well before the event, the Controller to approve the printshop to be used based on printed map samples using the IOF print tech sheets in respect to colour and sharpness of lines and edges.
  - Colour settings in OCAD/OOM/PP/Condes/other software may need to be adjusted, printshop settings adjusted and or the selection of another printshop.
  - Major IOF events require printshops to be approved and registered
- Before the event the Controller to approve the final version of all course maps based on printed samples.
- The Controller to approve all competition maps. Ideally this should be done at the printshop, certainly before the day of competition and definitely NOT on the day of competition.

Course markings

In the new Forest and Sprint specifications the old section called ‘Overprinting symbols’ has been renamed to ‘Course Planning Symbols’ to reflect changing technology to digital printing.

New symbol ‘Map issue point’ – if there is a marked route to the start point, the map issue point is marked using this symbol



Course markings

There are only two symbol sizes:

- Forest 1:15000 - The Control circle is 5mm dia. (changed from 6mm) and represents a 75m footprint on the ground.
- Sprint 1:4000 - The Control circle is 6mm dia. and represents a 24m footprint on the ground

Course markings at other scales are a strict enlargement:

- Forest 1:10000 control circle is 7.5mm dia. but still 75m footprint
- Sprint 1:3000 control circle is 8.0mm dia. but still 24m footprint

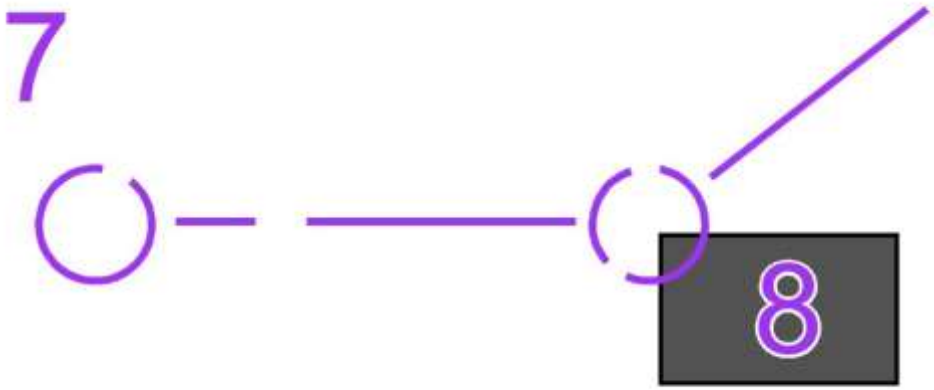
This means for events using 2 or more map scales ie M21E at 1:15000, M45A at 1:10000 and W60A at 1:7500, Control descriptions will stay the same irrespective of scale.

Course markings

Control circles and Course lines may be cut to increase the readability of underlying detail.

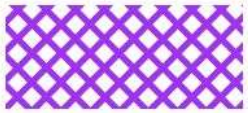
There should be gaps between the Control circle and Course line.

Optional white outline for Control numbers permitted on Sprint maps

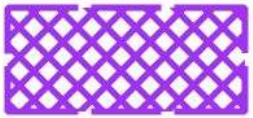


Course markings

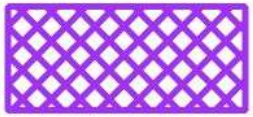
Out of bounds area



No taping

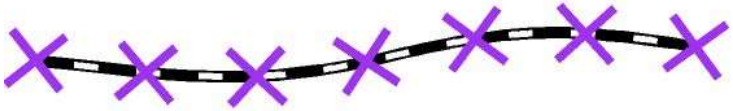


Taping intermittent



Continuous taping

Can cross but not go along



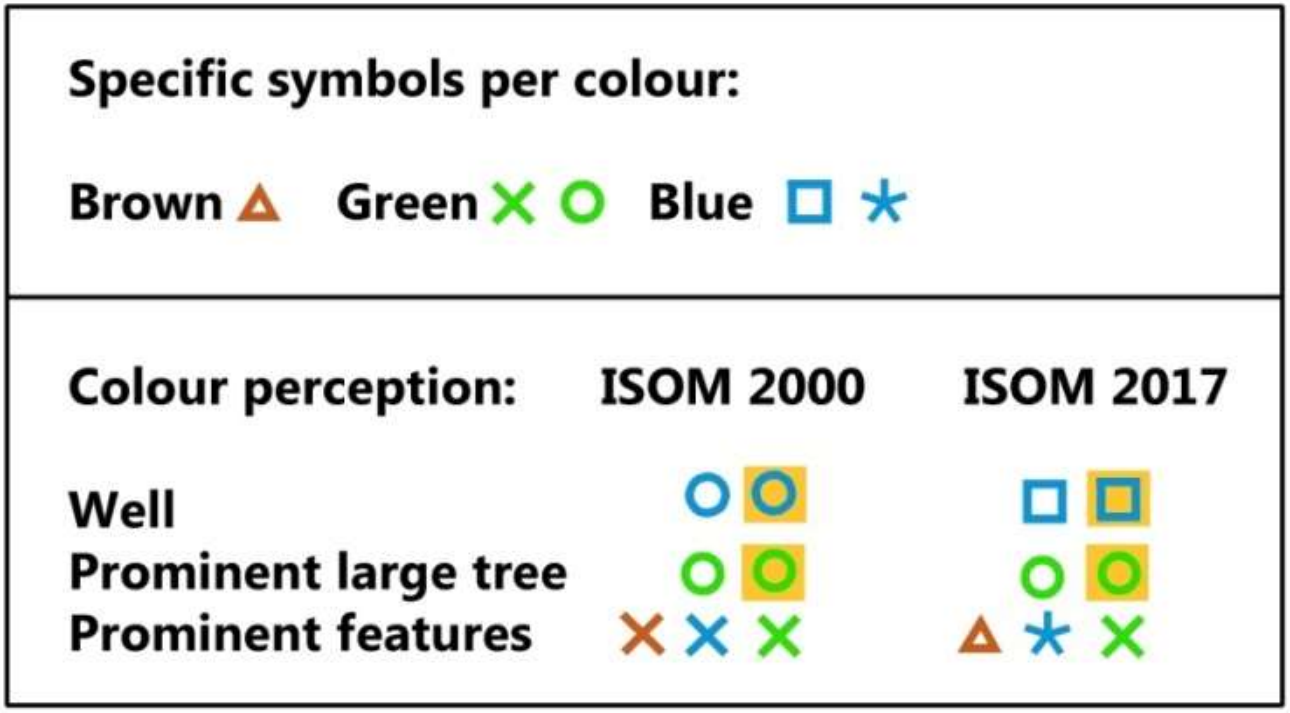
Can not cross

Can not cross except at Crossing point

Mapping general

Addressing colour blind issues

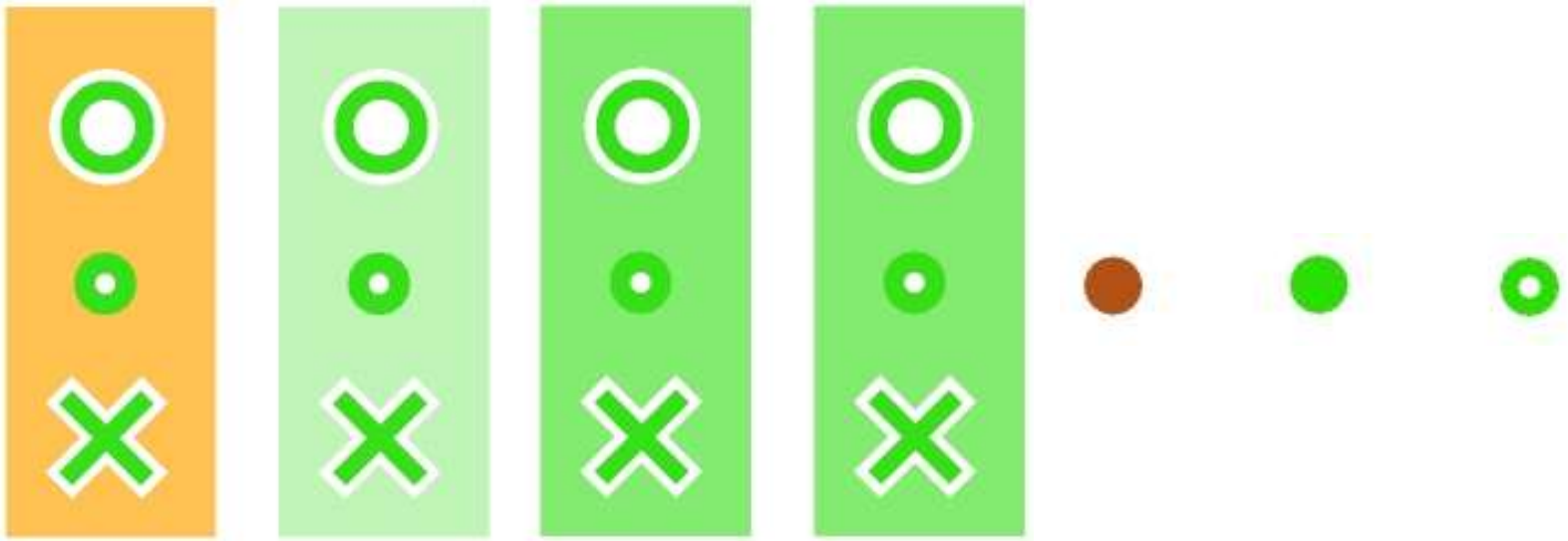
- Geometric coding introduced to Forest and Sprint specifications
  - Also for the IOF Schools symbol set



Mapping general

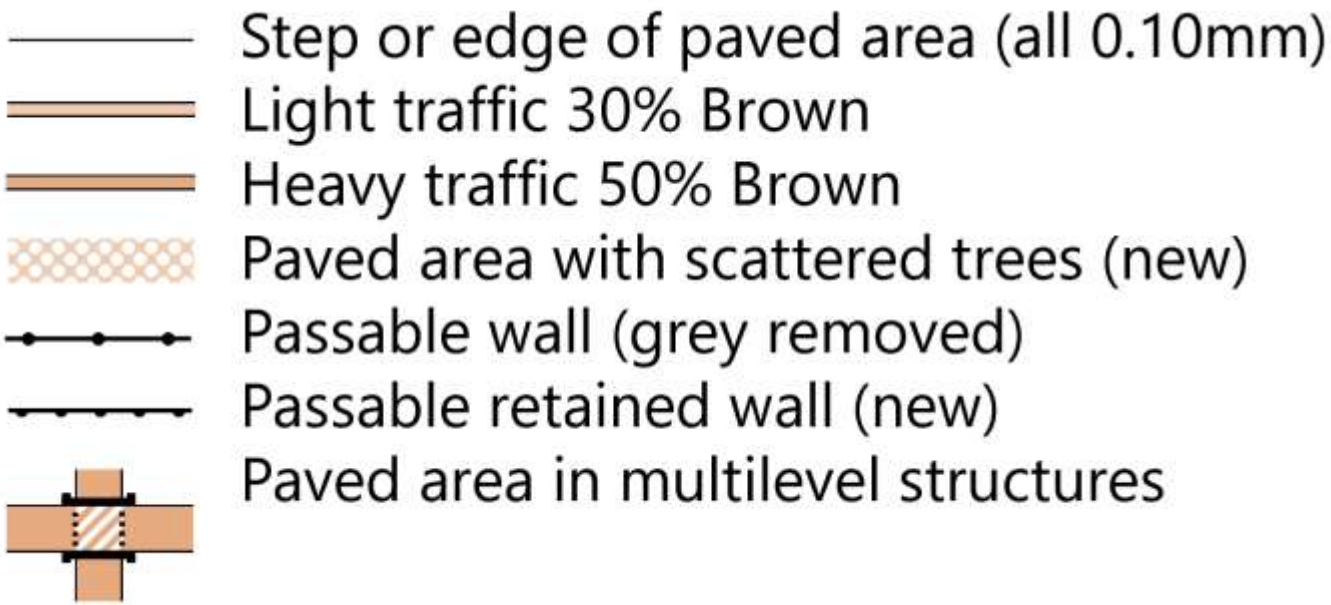
Addressing colour blind issues (continued)

- Addition of white mask to improve general legibility
- Addition of white dot to centre of green point symbol to distinguish it from the brown point symbol



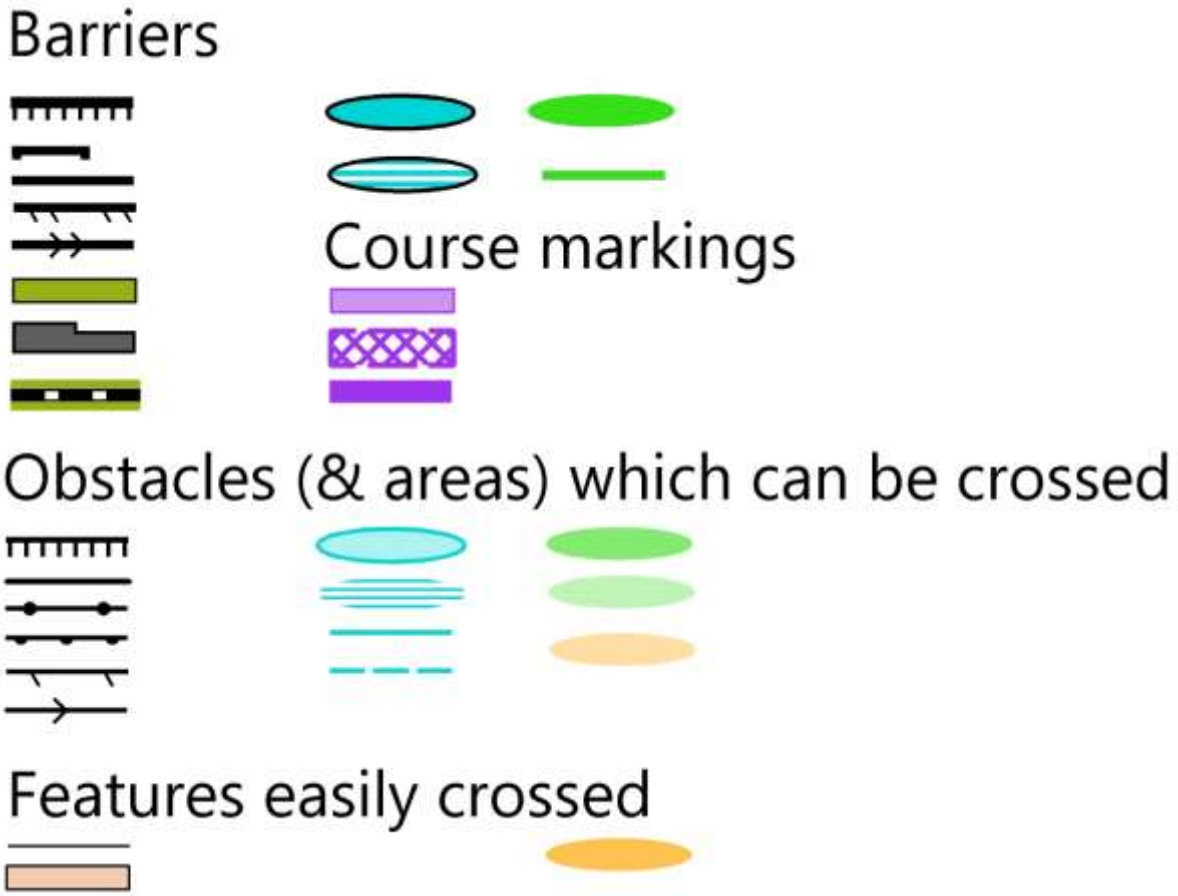
Mapping general

ISSprOM2019 main symbol changes



Mapping in general

Objective of Sprint maps to clearly show passibility of mapped features



Mapping in general

Colour vision generally decreases with age

Was Gaudi colour blind?

THE FOLLOWING SLIDES ARE TAKEN FROM MY PRESENTATION GIVEN AT THE 2019 OCEANIA MAPPING WORKSHOP.

THE SLIDES FOCUS ON INFORMATION RELEVANT FOR CONTROLLERS / EVENT ADVISORS.

May be used with acknowledgement.

MC News

The past 3 years have been very intensive for the MC

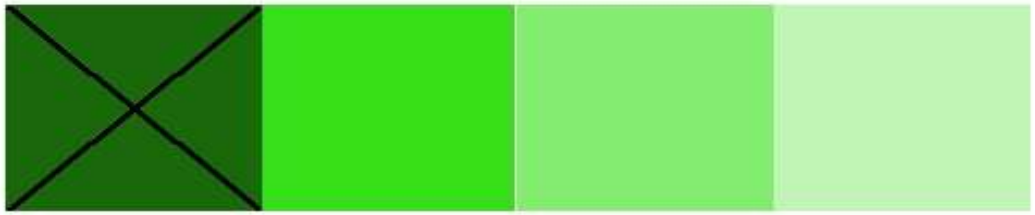
- **ISOM 2017 finally published**
  - **Revision process commenced 2008**
- **ISOM 2017-2 (Jan 2019) published**
- **New ISOM 2017 Appendix 1 – CMYK Printing and Colour Definitions**
- **New Control process of the mapping for major IOF events**
  - **Updated Feb 2019**
- **ISSprOM 2019 published (valid from 1 Jan 2020)**
  - **Revision process commenced 2017**
- **Rules removed from mapping specifications**
  - **Now in IOF Foot Competition Rules 2019 – '17. Restricted areas and routes'**
- **New Symbol Set for School Orienteering Maps 2019**
- **Revision of 'PrintTech' test sheet**
- **Revision of MTBO in progress**
- **Revision of Ski O just completed, preparing for publication**

MC News

Reactions to ISOM 2017-2 and ISSprOM 2019

- **Changes too frequent**
  - **Agreed to wait 2 years for the next version**

- **Removal of Impassable / forbidden Green in Sprint ie the 4th Green**
  - **Some objections to removal of 4th green for Sprint maps**
  - **4th green often too dark / virtually black on printed map**
  - **410 Vegetation (100% Green) when printed to specification is OK and in Sprint for it to be used as "forbidden" to be crossed**
  - **Review in 2 years time**



MC News

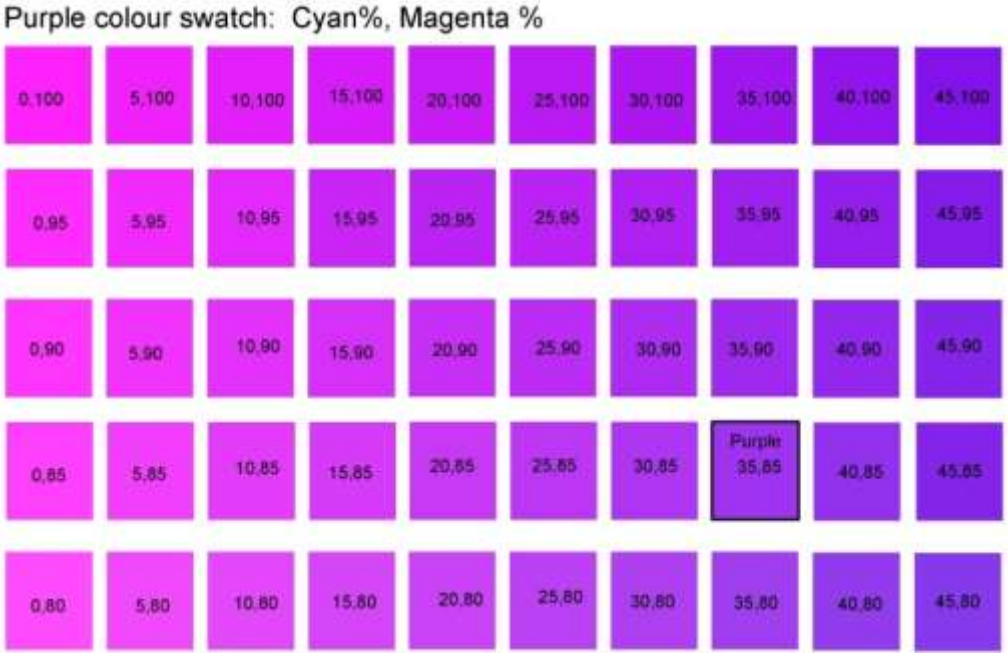
Recap main changes ISOM2017 to ISOM 2017-2

- **Removal of '2.12 Printing and colour' section to Appendix 1**
- **'Overprinting symbols' section renamed 'Course planning symbols'**
- **Symbols:**
  - **4th green removed**
  - **202 Cliff - thicker main line, round ends if no tags**
  - **107 Erosion gully – shorter min length to 17m**
  - **311 Well, fountain or water tank – size reduced, can rotate to fit / align**
  - **White mask to 417 & 419, small white centre to 418**
  - **Thicker line to Alternative 416 Dist veg boundary – green dash**
  - **Bounding line to Olive green**
  - **532 Stairway – new**

ISOM 2017 Appendix 1 – CMYK Printing and Colour Definitions

- **Permits laser printing**
- **Blue CMYK settings now 100% Cyan to improve sharpness of line edges**
- **Note setting for Purple : 35% Cyan 85% Magenta**

  Works well in most cases, is a compromise



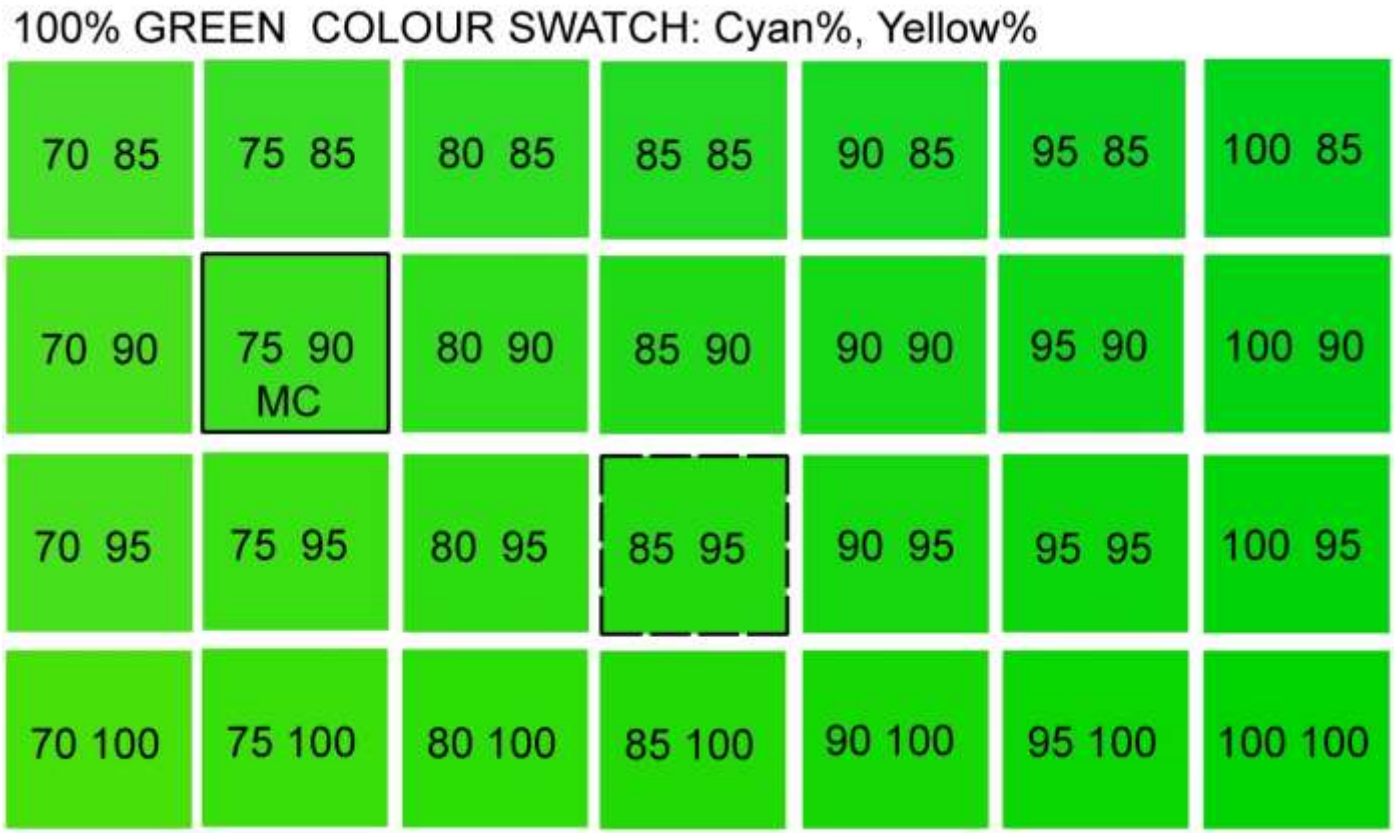
MC News

ISOM 2017 Appendix 1 – CMYK Printing and Colour Definitions

- **100% Green**

  Investigate changing 100% Green to a darker shade from

  CMYK 71 00 91 00 to say 85 00 95 00



MC News

Map control review for 2019

- MC seeking ways to strengthen map control process
  - Seeking support of Rules and Foot-O Commissions
  - Seeking guidance from IOF Council

- Footnote to Oceania
  - Request August 2019 for map check from mapper of ‘Racecourse Creek’, Oceania Middle Distance
  - 3 main issues
    - Wide use of 418 Prominent bush or tree : old symbol & should be used sparingly
    - Undersize areas of 214 Bare rock (225m2)
    - Objects of the same colour closer than minimum gap requirement (0.15mm)
  - All issues promptly resolved

MC News

Map control process – What is it?

- **A desk top map check done before the event**
- **No field visit**
- **Aim is to help the Senior Event Advisor, Organiser and Mapper in preparing a legible printed map for an orienteer on the run**
- **A three step process:**

  - **Check for minimum dimensions (lengths, widths & areas) and gaps for some critical symbols**

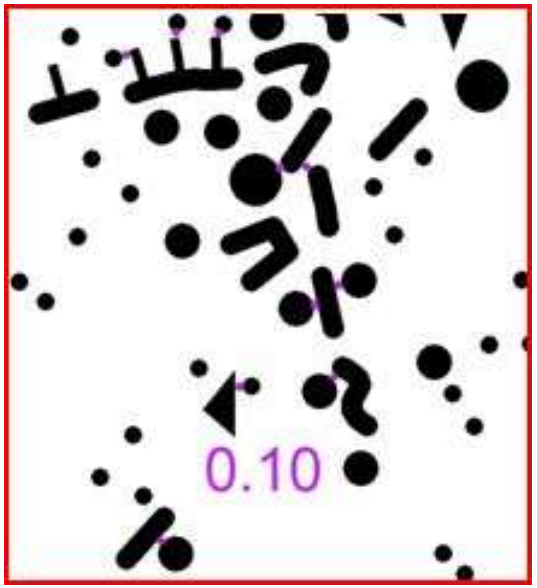
  - **Check for correct size of symbols for the specification**

  - **A visual check of the use of form lines and an overall check of the drawing**

Map control review for 2019

- **Some issues identified from MC map reports :**
  - **Poor drafting ie edge / border matching, touching / overlapping symbols of same colour**

  - **Violation of minimum gaps between symbols of the same colour**
    - **Min gap is 0.15mm**
    - **Purple dot here is 0.10mm**



Map control review in 2019

- **Some issues identified from MC map reports:**
  - **Inappropriate use of symbols ie Pillars used as buildings on sprint maps**
  - **Use of undersize symbols**
  - **Areas under minimum size ie 214 Bare rock (225m2)**
  - **In Sprint maps not cutting contours (especially the Index) crossing steps**
  - **Mapping fallen trees with 100% Green line is not implemented, use 419 Prominent vegetation feature.**

MC News

ISSprOM 2019

- Valid from 1 January 2020
- Scale 1:4000, contour interval 2.5 /2.0m or 5m for steep terrains
- Rules removed as requested by IOF Council
- Adoption of same numbering system as ISOM 2017-2
- Greater focus on legibility - like ISOM 2017-2
- Removal of urban and non-urban option for footpath and track symbols
- Printing section removed to ISOM Appendix 1, to include the colour order and CMYK settings
- ‘Overprinting symbols’ renamed ‘Course Planning Symbols’ - same as ISOM2017-2