Controllers Workshop: Mapping

Prepared by Adrian Uppill, October 2015

Rules applying to maps

- *International Rules*

Competition Rules for IOF Foot orienteering Events 2011
    Section 15. Maps
    Appendix 6. Competition Format - Map scales

International specifications for maps
    International Specification for Orienteering Maps 2000 (ISOM2000)
    ISSOM2007- Sprint
    ISMTBOM2010 - Mountain Bike
    ISSKiOM2009 – Ski

    All competition maps throughout the world must be drawn to these specifications
    "a map with deviations = unfair competition"

    Controllers need to know the requirements of an orienteering map as described in the specifications in respect to:
- Content
- Accuracy
- Generalisation
- Legibility
- Scale and symbol size
- Contour interval

Check list for controlling the map making of major IOF events

Guidelines for using non-offset printed maps in World Ranking Events

Guidelines for World Ranking Events
    Section 10. Model Event
    Section 11. Map

- *Australian Rules*

Competition Rules for Orienteering Australia Foot Orienteering Events
    Section 15. Maps

Applying the rules

Orienteering map rules are designed for running navigation hence the map must be legible and easy to interpret.

"a few well drawn features are better than a lot of small detail that may clutter the map or disguise the shape of the landform"

Terrain that cannot be legibly presented at the scale of 1:15000 is not suitable for orienteering (Sprint 1:5000/4000)

If the map is not legible at the print scale of 1:15000 (assuming offset, spot colour printing) then the mapper may need to:

- reduce the level of detail mapped ie greater selective generalisation

and or

- redraw the map having greater regard to simplification, displacement and exaggeration of symbols.

It is a map deviation to reduce the size of any symbol. Symbol size at the scale of 1:15000 is already at the limit of legibility for normal eyesight hence any attempt to reduce symbol size will render the map as being not 'legible on the run'.

A 1:10000 scale map is a strict enlargement of a 1:15000 map

Rowdy Flat 1:10000 is a deviation from the rules as many of the point symbols are undersize hence is not a strict enlargement of a 1:15000 scale map.

With the advent of LIDAR technology it is now possible to obtain superior contour and spatial accuracy to what was used for Rowdy Flat (the mappers did a great job given the original contours that were used).

Only one form line between contours

A form line must add information

There is a tendency to add too many form lines creating clutter thereby reducing map legibility.

Check minimum dimensions: gaps between lines, line length and area symbols

Respecting minimum dimensions aids map legibility. Drawing object too close to each other will reduce map legibility particularly if the map is to be non-offset printed. If non-offset printing is to be used then a wider gap should be considered.

A table of Minimum Dimensions can be found in ISOM2000 at 3.3 Dimensions of map symbols

Gaps between lines – check gaps between lines particularly of the same colour. Generally a minimum gap equal to a line width ie contour 0.14mm will be suitable.

Size of vegetation areas ie small clearing. A small area of Open land (yellow) can be difficult to impossible to read if it is undersize. It is also important that any small clearing is obvious in the field.
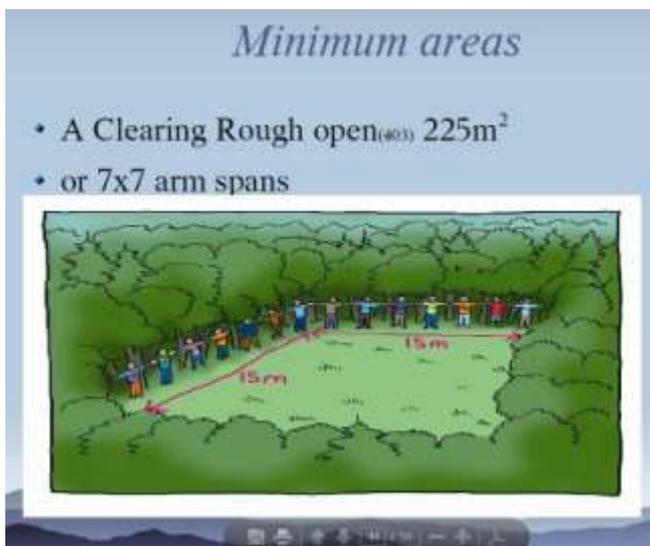
Length of cliff line – ensure the length of the cliff line meets minimum requirements. If less than minimum length then the cliff may appear as a dot on the map ie boulder.

OCAD can measure minimum lengths & areas. In the example below the cliffs highlighted are too short.

Be aware of what the symbol size represents on the ground

|		ISSOM			ISOM	
Symbol		1:5000	1:5000	1:1500	1:15000	1:15000
		Paper size	Ground size	Ground size	Paper size	Ground size
Pavement edge	ı	0.07mm	0.35m	0.15m	x	x
Pavement edge	ı	0.14	0.70	0.21	x	x
Small track	¦	0.18	0.90	0.27	0.18	2.70m
Contour line	ı	0.21	1.05	0.31	0.14	2.10
Watercourse	ı	0.21	1.05	0.31	0.14	2.10
Stony ground	·	0.25	1.25	0.37	0.20	3.00
Passable rockface	ⴿ	0.30	1.50	0.45	0.25	3.75
Index contour line	ı	0.35	1.75	0.52	0.25	3.75
Impassable fence	ᵼ	0.40	2.00	0.60	0.18	2.70
Impassable wall	ı	0.40	2.00	0.60	x	x
Footpath (min. width)	‖	0.49	2.45	0.73	x	x
Impassable cliff	ⴿ	0.50	2.50	0.75	0.35	5.25
Boulder	·	0.60	3.00	0.90	0.50	7.5
Paved road	‖	0.63	3.15	0.94	0.66	9.90
Small knoll	·	0.75	3.75	1.12	0.50	7.50
Large boulder	●	0.90	4.50	1.35	0.60	9.00
Man made object	o	0.98	4.90	1.47	0.80	12.0
Man made object	x	1.20	6.00	1.80	0.80	12.0
Rocky pit	v	1.25	6.25 (ht)	1.87	0.80	12.0

Quality of the printed map

The controller must ensure the printed map is legible in respect to colour and print quality.

Print tests need to be undertaken well in advance of the actual printing date, and approval obtained as required in respect to the printing method.

Do not check printing at the last moment and it is obviously too late to check maps just prior to the start (it has happened!). Keep in touch with the Print Shop – has the business been sold, do they have a new printer, what file format is required, different staff / print operator, paper stock, etc
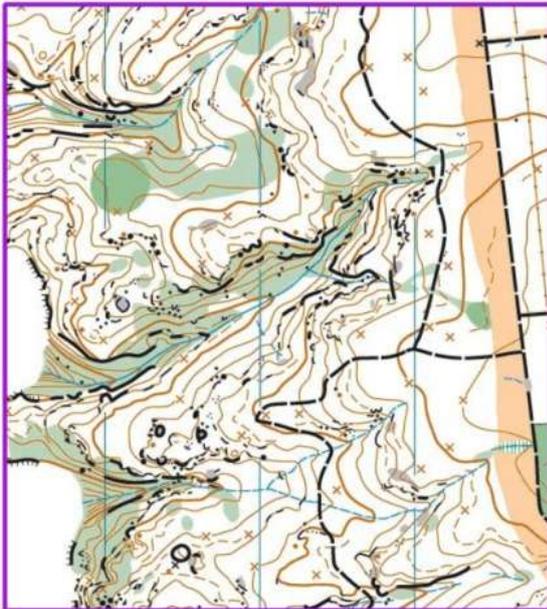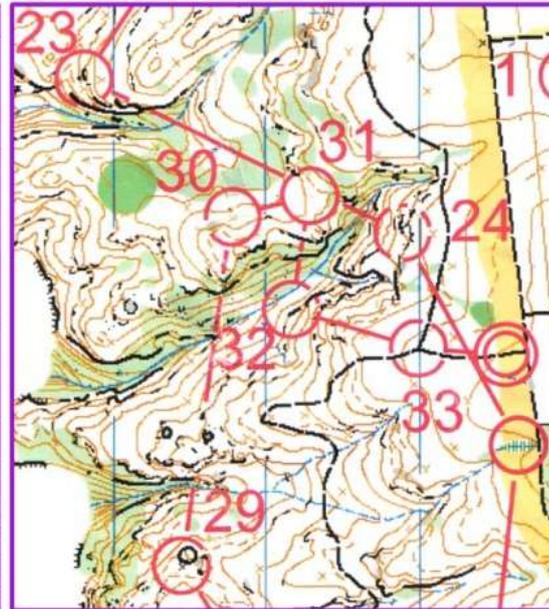
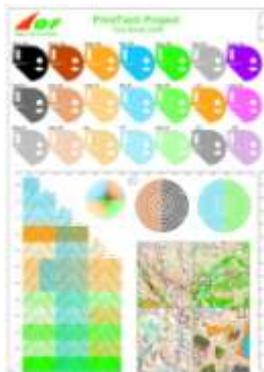**Use the IOF 'test sheet' to check print quality and colours**

Request print samples from the print shop to be used for map printing.

Compare the printed map to the IOF spot colour / offset printed 'test sheet'. Copies of the 'test sheet' are available from the OA Mapping Officer / Chair Mapping Committee.

Colour Purple

Do not use the default colour 100 % Magenta

Compromise setting for colour blind is:

C M Y K = 30 100 15 00

but check the printed colour on the map, adjust setting as necessary.

Consult with a colour blind orienteer (1 in 12 males are colourblind).

Paper quality

Bright white, matt finish, 80-120 g/m2

Impress DM Matt, 100gsm

Plastic bag 0.10mm

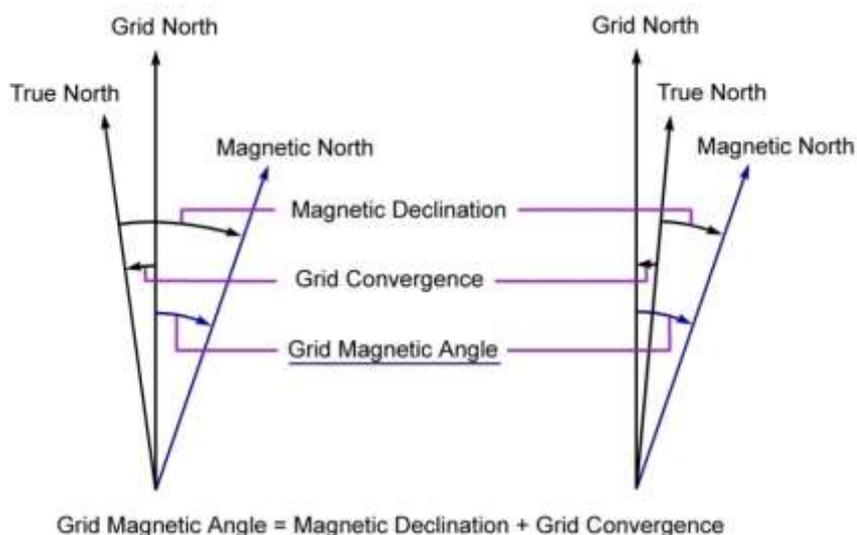Recommended water proof paper:

Teslin (150gsm)

Pretex 50.120 (120gsm)

Water proof papers are generally off-white as are Teslin and Pretex. For Elite races it is generally best to print on white paper and seal in a plastic bag.

Magnetic north

Check for the correct angle of rotation for Magnetic North

Grid Magnetic Angle = Magnetic Declination + Grid Convergence

Refer: http://www.orienteering.asn.au/wp-content/uploads/2013/09/Orienteering-A-Guide-to-Urban-Map-Making-2015.pdf

Check spacings of north lines.

>   Spacings are different for 1:10000 and 1:15000 maps

Check the need for breaks in N lines

Are the north lines parallel to the side of the page, and N at the top

Can use handheld GPS or Mobile Phone (with GPS) for controlling

Load course map file on to device

Will help check map accuracy and verification of control sites

Printing

Off-set spot colour printing is the only method approved for IOF ranking events, although non-offset OK with approval of Map Commissioner – see Guidelines for using non-offset maps in World Ranking Events.

For Level A events in Australia, digital printing is OK if there is no significant loss of line quality, legibility, colour appearance and map durability.

1:10000 maps more likely to be suitable for non-offset printing (but map must still be legible at 1:15000 assuming spot colour, offset printing)

Use the same print settings and paper for all maps used at an event
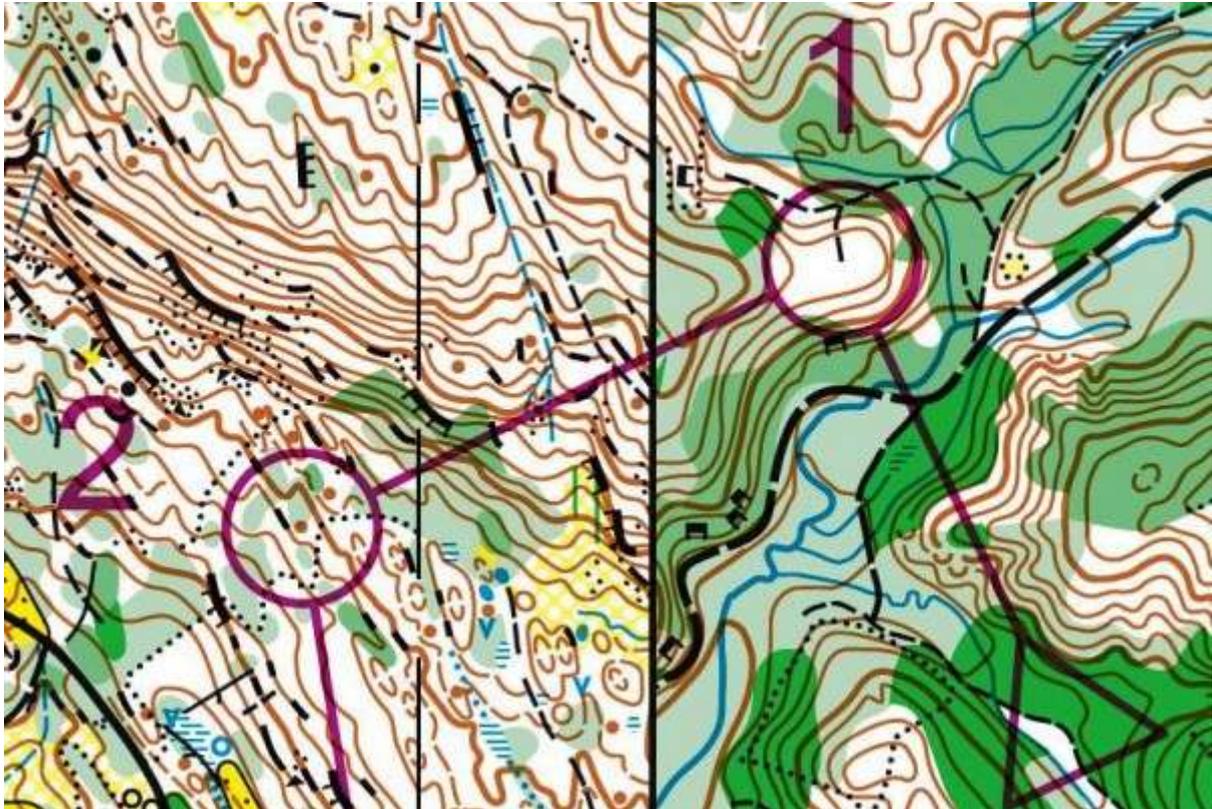
Non-offset Printing

Testing the suitability of non- offset / spot colour print machines for printing high quality orienteering maps is a continuing process.

A Print Tech 'test' sheet print from a printer in South Australia in May 2015 was sent to the IOF Map Commissioner who indicated:

 'the map printing depending to some extent on the terrain, should be suitable for WRE's for the map scale of 1:15000'.

Competition course maps must use overprinted course symbols.

A simulated overprint effect of course symbols can be achieved with some non-offset colour printers.

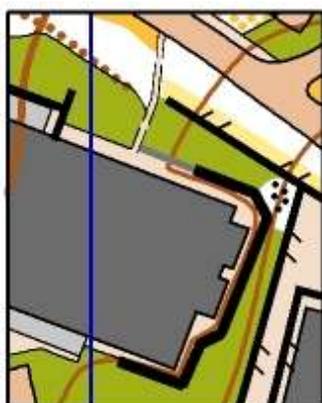**Sprint maps require special consideration**

The map must be legible and easy to interpret at <u>high speed</u>

Check minimum gaps – needed for legibility, especially for non-offset printing
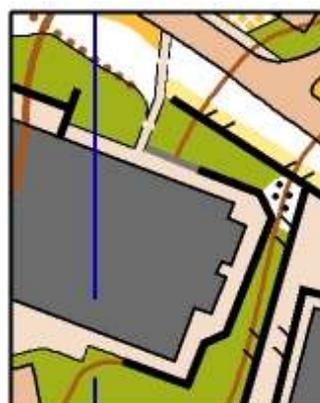
0.40mm gap between buildings and other impassable features
0.35mm gap between the bounding lines of Paths with paving infill
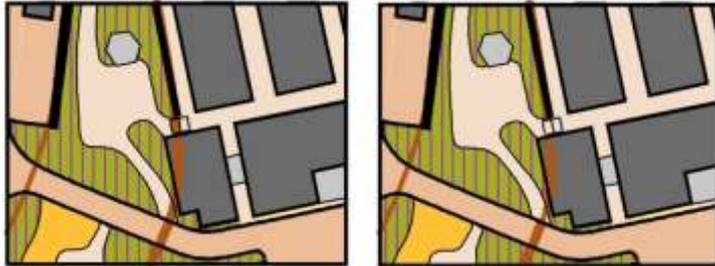0.15mm gap between lines (0.25 mm for blue)

not legible   legible

Cut contour lines at steps and or where contour lines, especially the Index contour, may reduce the legibility of pathways. Also small sections of Index contours can be changed to Contour lines to improve legibility.

Complex multilevel areas which cannot be mapped clearly or easily interpreted are not suitable for sprint orienteering

Only the 'main' ground level should be mapped

Underpasses and bridges shown if space available & easily interpreted

Controls not to be placed under or above the 'main' running level

No deviations of mapping specifications

Nb ISOM 209 Boulder cluster symbol permitted in Aust.

Examples of deviations:

'closed' gate symbol – do not use

Elongated 'H' symbol for seat - seats should not be mapped

Undersize 'X' for man-made feature – use correct size

Course marking

Use overprint effect for non-offset

A white border for Control Numbers will improve legibility particularly over building areas. White border ~ 0.10 - 0.20mm thick

Course Planning

Avoid overly complex course design involving multiple cross-overs and complex looping

Summary of factors that impact on an orienteering map

Reference material

Please refer to the OA Mapping Pages for more information on mapping and references.

http://www.orienteering.asn.au/category/menu/mapping/