MAPPING OF ROCK FEATURES April 2014 2.9

1. Introduction

1.1 The mapping of rock in recent years has been one of the strengths of orienteering in Australia. This has been largely because our granite terrain has presented challenges to mappers which test them to their limits particularly in the areas of interpretation and generalisation. Paramount has been the need to present to the competitor a map that conforms to the International Specifications, is legible to the competitor on the run and presents no surprises to the competitor when entering new terrain. The current mapping styles for granite developed from the WOC85 series of maps and was confirmed, standardised and publicised in an annual series of Mapping Workshops held up to the early 1990's. ISOM 2000 had changes which impacted on fieldwork and drawing of rock. These changes are reflected in this document.

1.2 The following is a documentation of what is believed to be current best mapping practice in Australia. It must be noted that these are guidelines and not rules. Individual mappers as they gain experience will develop their own flexible approach to problems confronting them. If the results conform to IOF Specifications then they are acceptable. However the final test is acceptance by both competitors and other mappers. Constructive criticism from these quarters must be accepted, and acted upon.

1.3 For orienteering to be sustained as an international sport then maps in all countries must conform to the International Specification for Orienteering Maps. (ISOM 2000). There is no doubt that excellent granite maps are made within these Specifications and to move outside them is both unnecessary and in fact puts overseas competitors at a disadvantage when competing here, and our own orienteers at disadvantage when competing overseas.

1.4 ISOM 2000 assumes drawing will be done on computer using appropriate software. In Australia this will mostly on OCAD. All versions of OCAD from five to eleven will produce results that conform to the current ISOM. With computerised drawing the variation in line widths and symbol sizes seen with manual drawing is removed.

Maps printed using spot colour offset now should have the same line weights and symbol size as appears on the drawing screen.

1.5 These notes are based on spot colour offset map printing as specified in the current ISOM. Digital printing of orienteering maps is popular in Australia due to convenience and small competitor numbers. To date, digital printing has not been able to reproduce the same fine lines and dots of the equivalent 15000 print, spreading the size of the item and reducing legibility. Successful digital printing requires a series of trial prints to obtain the best result for the orienteer. The trial print will show any deficiencies in specified symbol sizes and colours. To obtain a map where the symbols are the correct ISOM size will often require the reduction of the line weight and dot size of the smaller features.

2. Fieldwork of Rock Features

General

The general rules for mapping rock features are:

2.1 Interpretation is based on what the runner sees when first entering an area. The mapper should not give any great significance to features noticed only after being in an area for some time. Basically we must map the big features well and be prepared to generalise the rest. On the final map the larger features must stand out from the clutter of smaller features.

2.2 The mapping of the features must be such that the runner can get a realistic picture of the terrain by reading ahead on the map. There should be no surprises for the runner when entering an area.

2.3 In many cases there is more than one way to map a feature, the fieldworker must be aware of and explore all the options before choosing the best option in the context of the feature and the area.

2.4 The map is made up of symbols : area symbols are the only ones to correct scale on the map. Line symbols are correct as to length but exaggerated in width. Point symbols are larger than the feature in every direction (four small boulders take up the same map area as the average Australian house). The clear distinction between point, line and area symbols must be recognised. The mapping of many point features in areas of detail leads to a breakdown in legibility and relative positioning of features. The fieldworker must understand the concepts of generalisation, relative positioning and map legibility to map areas of detail.

2.5 The runner will often navigate to avoid large blocks of black areas on the map as many black features indicates rough terrain. The gaps between the black areas are highly significant to competitive orienteers, these gaps must be reliably and accurately mapped.

2.6 In areas of rock the landform bears very closely to the rock features. Therefore the contours showing the land shapes must bear the same relationship to rock on the map as it does on the ground.

2.7 Contour shapes are paramount, accurate depiction of contours is essential for navigation, the confidence of the orienteer and often provide the most unambiguous control sites for the course setter.

2.8 In granite, other rock terrains and all worthwhile orienteering areas there is no need to try and create control sites. The map is made for the orienteer, not the course-setter.

2.9 The classification of features by the fieldworker becomes a problem at the margins. As a rule of thumb if there is an ambiguous choice between use of different symbols then the simplest solution should be taken usually using the symbol which has the lesser impact on the map.

2.10 Minimum dimensions of and between symbols must be maintained if the map is to be legible. Minimums are set out at Section 3.3 of the IOF Specifications. With earlier editions of OCAD it can be difficult to determine minimum dimensions. As a rule of thumb, features in the same colour should be separated by at least the width of a single contour for black and brown, with greater width between other colours.

2.11 The mapper should make a judgement about areas on the map in which any feature mapped would be a likely candidate for an unfair control (features in dark green, extremely hazardous areas, etc.). Such areas should be mapped in a generalised way so that the hazard is obvious but they are not attractive to an inexperienced course setter for the placement of controls.

3. Scale

3.1 For classic event orienteering the IOF approved scale is 1:15,000 and this scale should be used for national level events in Australia. Variation from this scale must be approved by the OA Technical Director. In complex areas 1:10,000 scale prints of the 1:15,000 map should be produced for older and younger age groups. Additionally 1:10,000 scale maps may be used for middle distance event orienteering for elite classes. For both 1:15,000 and 1:10,000 maps fieldwork should be at the scale of 1:7,500.

4. Rock Features

The following notes should be read in close conjunction with the IOF Specifications, they upplement the Specifications for Australian conditions.

These notes do not replace the IOF Specifications.

4.1 Impassable cliffs - ISOM 201

Extended lines of impassable cliffs are a hazard to the orienteer and a significant determinate of route choice. Any gaps shown whether as full breaks or as a change to passable cliff must be both genuinely passable and capable of being recognised by the orienteer in competition conditions. The "quarter moon" symbol is typically used widely for both impassable and passable cliffs. The use of tags is usually to emphasise particularly dangerous or prominent cliffs.

The length of the tag in the Specification extends over 7.5 metres on the map together with the bar of 5 metres this greatly exaggerates the area that an essential line feature covers. Tags when used are often shortened to avoid this. The tags, however, can and should be lengthened to show a feature comprising a sloping cliff that extends for a considerable distance. In this case a line feature is used to map to scale an area feature.

Very short cliff faces while technically impassable are mapped using the passable rock face symbol (203) if they can be easily passed on all sides and are insignificant in regard to route choice.

Rounded ends or ends which taper off into passable rock faces are used as necessary.

4.2 Rock pillars/cliffs - ISOM 202

This is an area feature showing a massive boulder to scale.

It does not make sense for this symbol to be used for both rock pillars (massive boulders) and cliffs as the orienteer cannot picture in advance what the terrain will look like. It is Australian practice to only use this symbol for massive boulders which can be shown as area features to the correct scale on the map.

Like all features these boulders are mapped from the orienteers viewpoint, that is the impression gained when running into and through an area rather than a close-up examination of the feature. Thus slits or cracks in the rocks are ignored if the overall impression is of a single entity.

Often the size of the feature must be exaggerated to ensure it stands out from the surrounding point symbols of small, medium and large boulders which in turn take up much more room than their actual feature.

Australian practice reserves this symbol for features which are not only massive but also are very high. Options for lower features include circular rock faces, rock face plus contour or high point.

4.3 Passable rock face - ISOM 203

Tags should only be added if there is ambiguity over which way the feature faces or if the face extends for considerable distance horizontally.

* Care should be used when using this symbol as a circular rock face for large, low boulders as it often grossly exaggerates the size of the feature. Other options include combinations of contours/high points and shorter rock faces.

4.4 Boulders - ISOM 206 and 207

The ISOM allows for small and large boulders with a drawing diameter of 0.4 and 0.6. A 0.5 boulder can also be used to show the distinction between boulders with a significant difference in size (particularly between adjoining boulders).

Every boulder on the map should have a minimum height of one metre and be immediately identifiable on the ground. The mapper should set minimum sizes for various size boulders according to the terrain. Individual boulders should generally conform to the standard however other boulders may be mapped if they are particularly distinctive in the terrain. The sides of boulders should have a high degree of verticality, if the feature can be run onto or over then other options should be tried - mapped as a high point or combined rock face/contour. The boulder symbols are also used for boulders which are split, shattered or piled on top of each other, interpretation is based on what the orienteer sees when entering the area.

Interpretation in the field can present some problems. If there is doubt on first viewing the feature then it should be viewed from a distance from all sides and mapped as its majority view. Interpretation must not be done through close up examination of the feature.

Symbols 206 and 207 are for point features; very large boulders which can be shown to correct scale are drawn with symbol 202 and should reflect the actual scale and shape of the feature.

The term 'immediately identifiable" is to be taken as referring to the competing orienteer. Small or marginal boulders not "immediately identifiable" should either not be mapped or generalised as part of rocky ground or as part of a boulder field.

The large boulder (207) and medium boulder (0.5 drawing size) should be major features in the terrain and be identifiable to the orienteer from the distance. On occasion large boulders may be mapped in areas of boulder fields of smaller boulders if they are particularly distinctive. As a rule of thumb no more than 10% of all mapped boulders should be large boulders.

4.5 Boulder field - ISOM 208

This is an area symbol which will show the extent and shape of the area covered by groups of boulders. It is used for:

- an area of three or more mappable boulders which cannot be drawn to scale

- an area of mixed boulders and near boulders, the individual boulders within which cannot be drawn so they are immediately identifiable to the competing orienteer. Such an area can include

passable rock faces as part of the boulder field.

- a group of smaller boulders associated with a larger rock feature ISOM specifies the size of the symbol as 0.5 to 1 on the long side of the triangle. An enlargement of 20% is permitted to show significant difference of size of boulders within the boulder field.

The shape of the triangles is not specified and different size boulder field triangles may be used depending on the size and aspect of the feature. In general larger, "chunky" triangles should be used for boulder fields made up of larger boulders.

"Thin" triangles with an angle larger than 90 degrees should be avoided as they can be confused with the passable rock face symbol.

Boulder field triangles should not be used singly except when in association with another (usually larger) rock feature.

When a single triangle is used with an associated rock feature it should be orientated so that its shape best reflects the feature.

Runnability within the boulder field is shown by the density (spacing) of the triangles.

A clearly defined edge of a boulder field is often used as a control site, therefore the drawn symbols must closely reflect the terrain.

When drawing, the OCAD default symbols for 208 should not be used. Each triangle is easily drawn using the straight line drawing tool and symbol 202. This gives the mapper precise control of the shape and density of the feature.

4.6 Boulder cluster - ISOM 209

IOF: "A small distinct group of boulders so closely clustered that they cannot be marked individually."

A boulder on top of another boulder is not a boulder cluster but an individual boulder. The boulder cluster is a point symbol, the feature should be restricted in area (at least smaller in area than the symbol), with defined edges. A rule of thumb is that if the feature would not make an unambiguous control site then it should be mapped as a boulder field rather than a cluster.

If the cluster includes a boulder that is significantly higher than the others then the significant boulder should be mapped with the appropriate symbol and the others either generalised as boulder field or left off.

It is permitted to enlarge this symbol by 25% for particularly large and prominent boulder clusters.

4.7 Stony ground - ISOM 210 IOF: "Stony or rocky ground which affects going ..."

Local practice uses the symbol to show significant rock which is not shown with the other symbols as well as rocky/stony ground which affects runnability. The edges and density of the dots used are decisions taken in the field and the position of each rocky ground dot is placed deliberately to reflect the appearance of the feature to the orienteer.

IOF specifies the size of dot as 0.16 to 0.2. Experience shows the smaller dots are barely legible at printed size. A 0.19 dot is the smallest that is acceptable.

A problem has arisen where there are two distinctive rocky ground types in the one terrain. This happens in the situation (more usual in some desert area gully/spur terrains than granite) where there are both distinctive rocky outcrops and areas of ankle-breaking slow run stony ground. Dot sizes in this situation would be 0.24 and 0.19. This does not conform to the current ISOM and needs approval if used for major events.

The stony/rocky ground will often include marginal boulders and rock faces which should be included as part of the black dot symbol. Boulders or rock faces which are immediately identifiable in the area must be drawn so that they are immediately identifiable within the stony ground symbol.

The drawing of the edges of the stony ground is critical as a clearly defined edge will often be a control site.

4.8 Bare rock - ISOM 212

There is a continuum between bare rock to moss covered rock to clearing. In Australia practice is to include the lichen covered rock within the bare rock with the clearing being mapped in the relevant yellow.

In granite terrain sloping bare rock may be runnable to the competitor going uphill but be a passable or even impassable cliff going downhill. In this situation the bare rock is mapped with the relevant cliff symbol superimposed.

Runnability is judged by the mapper as in dry conditions, the competitor must make their own assessment in actual competition conditions.

4.9 Small knoll - ISOM 112 and 113

The brown dot on the map is defined as a mound or rocky knoll too small to be drawn to scale with a contour. In granite the brown dot knoll is almost always a rock feature. The feature should be one metre above the surrounding ground.

The oval shaped dot is available to show a specific shape, however irregular shapes can only be shown by use of contours.

These symbols must be used and drawn very carefully when in association with other features (the brown dot is obliterated by a rock face and obliterates the grey of bare rock).

5. Additional symbols

There is a potential danger in the use of OCAD in the ease in which additional symbols can be made. Local experience shows that except for those listed above there is no advantage in using additional symbols. Producing a greater range of symbols greatly complicates the fieldwork process with often illegible differences on the printed map.

6. Relation of Rock Features to other Symbols

6.1 Other black features

The representation of man-made features among areas of rock presents some difficulty for the mapper if legibility is to be maintained. Tracks are of major significance to the orienteer, to ensure that they are legible on the map the track should be mapped first. If necessary the surrounding rock can be shifted slightly and generalised so that the track becomes the central figure. A full yellow highlight line may be used to ensure the clear legibility of the track through areas of rock detail.

Fences must also be mapped and drawn so they are clearly visible on the map. Broken fences are mapped where there is room but can be left off if necessary. If they are left off they should be clearly taped in the terrain and the event information should detail their treatment.

With black point features the mapper must first make a judgement about the importance of the feature to the orienteer and if it is to be mapped. If it is to be mapped it must be legible among the surrounding rock features. This can be achieved by generalisation as described in Section 2.4 of the IOF Specifications.

6.2 Brown features

In rocky areas it is the rock which creates the landform and the contours will reflect this. Rock faces and cliffs should bear a strong relationship to the underlying contours with the contour being extremely likely to be on the cliff line. Similarly bare rock areas often form areas of raised ground or spurs and this should also be reflected in the contours.

6.3 Blue features

Clear space must be allowed so that the short watercourses, small marshes and other water features are clearly legible. Care must be taken that the correct PMS blue is used, if a darker blue is used the small circular waterholes are easily confused with boulders.

6.4 Green features

In detailed areas passageways between and through rock features are important to the orienteer. The greens must be mapped to reflect this.

6.5 Yellow features

There is a fine dividing line between bare rock and open land. The judgement should be made on the impression gained on first entering the area. If the impression is of runnable rock then it should be mapped as bare rock even if it has a cover lichen or moss. If a grassed clearing then as open. The area can be generalised with open areas having small areas of bare rock and bare rock areas having some small grassed strips or patches.

7. Mapping of rock for sprint maps

7.1 The ISSOM was issued in 2006 and the rock symbols and definitions are closely aligned with those of ISOM 2000.

The ISSOM's implication for fieldwork is largely due to the increase in scale from 1:15000 to 1:5000 (or 4000). The notes above apply to the larger scale regarding interpretation and the specific symbols. It follows that a sprint map cannot be a mere enlargement of a 1:15000 map.

7.2 Any use of a 1:15000 (or 1:10000) as the base for a sprint map must review every rock feature.

At 1:5000 all large boulders can be expected to be drawn to scale. Boulder fields will often become a group of individual boulders and generalised features can be mapped in detail. However overmapping must be avoided, minimum sizes must be retained and the basic criteria of mapping from the viewpoint of the elite orienteer maintained. In particular the criteria that every boulder must be immediately recognisable in the terrain must be reflected on the map.

7.3 An anomally in the ISSOM is that the boulder cluster symbol has been dropped. The OA Map Committee has considered this and has permitted the boulder cluster to be used in sprint maps.

8. Variations to IOF Specifications

In many detailed granite maps the mapper may find one or two places where a minor variation to IOF Specifications seems necessary. This may entail the use of a symbol in a non-standard way or a

non-standard variation in size or shape of a symbol. This is allowable provided the feature is not used for or is not crucial in finding a control site.

Any significant variation from IOF Specifications or from practise spelt out in this document must under OA Competition Rules be approved by the relevant mapping body. For international events this is the IOF Mapping Committee. For national events (including Australian Championships, Australian 3-Days) approval is required from the Chair of the OA Mapping Committee. Variations for other maps requires the approval of the relevant State/Territory Delegate to the OA Mapping Committee or State/Territory Mapping Officer.

The above guidelines are authored by Alex Tarr. Comments and feedback are appreciated and should be addressed to the Chair of the OA Mapping Committee or direct to Alex Tarr at alexjanettarr@gmail.com

The above guidelines were approved for use in Australia by the Orienteering Australia Mapping Committee, April 2014.