SAMPLE NUMBER: 626663 MAC 40 87.7m
SUMMARY DESCRIPTION:

This sample is a mafic-crystal-rich dolerite with a most unusual texture. Large phenocrysts of augite, most with ophitic inclusions of altered plagioclase and some as much as 6mm long, are totally pseudomorphed by pale actinolite and minor chlorite. These large altered augites make up probably 40 modal% of the rock. The remainder is composed of much smaller, equant fresh augite crystals that occur in clusters of subhedral grains intergrown with less abundant plagioclase laths. The latter are altered to very fine-grained epidote. Oxides are volumetrically minor, and altered to leucoxenitic material; many had rather acicular shapes suggestive of ilmenite rather than FeTi magnetite, which is surprising in rocks of this composition. Mesostasis between crystals is composed of messy chlorite-submicroscopic epidote and some prehnite. A few small deep brown to green zoned amphiboles are present in interstitial areas, and these probably record late stage reaction between late magmatic fluids and the pyroxenes. I have no idea why the large augite crystals are totally actinolite altered and the small augites are perfectly fresh. No doubt this is a Charter Dolerite, and the low greenschist facies of metamorphism is notable.

SAMPLE NUMBER: 626664 MAC 40 115.6m
SUMMARY DESCRIPTION:

This sample is a moderately hydrothermally altered formerly augite+olivine-phyric metabasaltic lava in which occasional xenocrysts of rounded albitized plagioclase and resorbed quartz are notable. The olivine phenocrysts are entirely altered to fine-grained quartz, calcite and chlorite, and several larger (1-2mm-sized) phenocrysts contains small chromite inclusions. Augite occurs as small subhedral fresh phenocrysts that are mainly gathered in multicrystal clots of four or more crystals. The few quartz xenocrysts have rims rich in fine-grained augite, attesting to a primary origin and recording reaction of the xenocrysts with the melt. The rounded albite xenocrysts are moderately sericite altered. The groundmass of this lava is composed of small laths and microlites and albitized plagioclase and equant, granular augite, set in chlorite after glass. There are also abundant tiny leucoxene globules after FeTi oxides. The alteration of this sample is a weak carbonate overprint on a regional low-grade burial metamorphic assemblage of albite-chlorite-leucoxene.

SAMPLE NUMBER: 626665 MAC 40 210.4m

SUMMARY DESCRIPTION:

Despite the apparent lava breccia/volcaniclastic texture of this rock in hand specimen, this sample is a formerly coherent, moderately altered formerly glassy mafic andesite or evolved basaltic lava with a perlitic-textured groundmass. All phenocrysts are thoroughly altered, and most appear to have been originally plagioclase and augite. The former has altered mainly to sericite, the latter to chlorite and sericite. The groundmass was formerly glassy, and perlitic cracks are still abundantly preserved through the rock, being picked out by chlorite whereas the rest of the formerly glassy groundmass is composed of a extremely fine-grained intergrowth of sericite, quartz and chlorite. Small pencil-shaped crystals of apatite are quite abundant, and suggest that this samples falls at the shoshonitic end of the Hellyer Basalt spectrum. Abundant small messy patches of very fine-grained opaques, leucoxene, and chlorite represent common former FeTi oxide microphenocrysts. Scattered trails and spots of fine-grained pyrite are common in the groundmass and also in former phenocryst sites. The hydrothermal alteration in this sample is pyrite-sericite.

SAMPLE NUMBER: 626666 MAC 40 272.9m

SUMMARY DESCRIPTION:

This sample is a moderately hydrothermally altered plagioclase-phyric andesitic lava with around 5 modal% of small albitized plagioclase phenocrysts, a few chlorite-altered augite phenocrysts, and not uncommon leucoxene-altered FeTi oxide phenocrysts and micro-phenocrysts. Many plagioclase phenocrysts occur in multi-crystal clots of four or more mainly subhedral crystals, and clots are usually < mm across. The groundmass is a mottled intergrowth of tiny albite microlites showing strong flow alignment, set in a submicroscopic quartz-feldspar intergrowth after glass. Spotty chloritic groundmass patches, also hosting tiny plagioclase microlites, are less abundant. Patches of secondary quartz and calcite are common, and narrow quartz and calcite veinlets cut the sample; at least one fracture filling contains a core of deep yellow sphalerite and minor pyrite.

SAMPLE NUMBER: 626667 MAC 40 326.9m

SUMMARY DESCRIPTION:

This sample is a quite strongly altered but texturally well-preserved andesitic lava with common areas or preserved perlitic cracks throughout the groundmass. Plagioclase phenocrysts mainly 0.5-2mm long probably made up around 5 modal% of this sample, but all have been thoroughly replaced by epidote and minor chlorite and sericite. A few small augite phenocrysts are replaced by epidote and chlorite. Leucoxene-altered FeTi oxides are less abundant than in the previous sample. The groundmass varies texturally from paler, less altered areas in which perlitic textures are well-preserved in fine-grained quartzo-feldspathic intergrowths after glass, to darker domains with abundant chlorite and fine-grained epidote. An unusual feature of this sample is the presence of not uncommon anhedral spots of brown chalcedonic silica(?) growing in with secondary clear quartz and chlorite.

SAMPLE NUMBER: 626668 MAC 40 421.6m

SUMMARY DESCRIPTION:

This sample is a polymict andesitic to dacitic volcaniclastic in which matrix between clasts has been largely winnowed out. Most clasts are sparsely to moderately plagioclase-phyric dacitic lavas, the largest clast clearly banded, with devitrified and recrystallized formerly glassy groundmasses. Clasts/fragments reach at least 1.5cm across. An important and distinctive feature of most of these clasts is the presence of occasional small (<0.5mm) quartz phenocrysts, many partially resorbed. I am unaware of any quartz-phyric EXTRUSIVE rocks in the Que-Hellyer region that pre-date the Hellyer Basalt, and the quartz-phyric intrusive sheet that extends NE from the High Point area is usually more coarsely crystalline, with bigger phenocrysts of quartz. One of the clasts is composed almost entirely of epidote, but small plagioclase and a single quartz phenocryst are still evident. Clast margins fit snugly in against neighbouring clasts, and imply strong pressure solution during compaction and lithification. Alteration of this rock is typical of regional burial metamorphism rather than localized hydrothermal alteration.

SAMPLE NUMBER: 626669 MAC 40 474.0m

SUMMARY DESCRIPTION:

This sample is an unusual, strongly vesicular and brecciated olivine-phyric basaltic lava containing several inclusions of more evolved lava. Most of the rock consists of a highly vesicular, formerly glass basalt with the glass replaced either by chlorite, or by fine-grained quartzo-feldspathic material heavily riddled by chlorite. Rapid changes in the abundance and alignment of vesicles indicate that the rock is a lava breccia rather than a coherent lava, Former olivine crystal sites are present, but not common, and are mainly replaced by fine-grained quartz and chlorite. A few small augite phenocrysts are replaced by epidote and minor chlorite, and quite large chromites are not uncommon. Vesicles are mainly filled by quartz and albite. This rock contains a 2cm diameter inclusions of a formerly glassy lava with a few modal % of both albitized plagioclase, and deep olive green primary hornblende phenocrysts set in murky devitrified glass. This inclusion is petrographically indisting-uishable from the more evolved Anthony Rd (Type 2) hornblende andesites further south in the Mount Read Volcanics, and may provide a time line between the northern and southern parts of the belt. I am convinced that the hornblende andesites of the southern part of the belt fill the time gap between the Que Footwall Andesites and the Hellyer Basalts. The basalt and its dacite inclusion are only weakly regionally altered.

SAMPLE NUMBER: 626670 MAC 40 481.8m
SUMMARY DESCRIPTION:

This sample is a hydrothermally altered formerly glassy dacitic lava with around 5 modal% of small albitized plagioclase phenocrysts. There were no mafic silicate phenocrysts in this rock, and the few former FeTi oxide microphenocrysts are altered to messy leucoxene. The groundmass was undoubtedly glassy, but has devitrified, then recrystallized to a fine-grained even-textured quartzo-feldspathic intergrowth with abundant coarser spots of secondary quartz. Disseminated fine-grained pyrite makes up perhaps 1 modal% or a bit less of this sample, and occurs as single grains <0.1mm across, occasionally organized into small, diffuse trails. The rock is transected by common veinlets composed of albite and quartz. Small rhombs of calcite overprint parts of the groundmass, but are not abundant. The hydrothermal assemblage of this sample is silica-pyrite.

SAMPLE NUMBER: 626671 MAC 40 544.6m

SUMMARY DESCRIPTION:

This is a polymict lava breccia of dominant dacitic composition, but containing at least one large basaltic clast more than 1 cm long. Most of the sample appears to be composed of a single, brecciated and quite altered dacitic lava carrying around 2 modal% of small, euhedral albitized plagioclase phenocrysts, with no sign of former mafic phenocrysts. The groundmass of this sample was glassy, and several less altered areas still preserve perlitic crack textures. Most of the groundmass is now composed of an exceptionally fine-grained quartzo-feldspathic material variably riddled with chlorite, to some domains that are composed of more than 60 modal% fine spotty chlorite. A very small amount of disseminated pyrite is present in the rock. The obvious basalt fragment included in this lava breccia is an evolved plagioclase+olivine+sparse augite-phyric Hellyer-type basalt with a microcrystalline groundmass composed entirely of chlorite after glass and augite, riddled by tiny albite laths. Quartz veins are present, but not common, and contain occasional crystals of well formed epidote and sphene.

SAMPLE NUMBER: 626672 MAC 40 663.0m

SUMMARY DESCRIPTION:

Although this sample does appear to be finely plagioclase-phyric in hand specimen, it is actually a strongly augite+olivine-phyric lava lacking any plagioclase phenocrysts. Calcite replacing some olivine phenocrysts probably appears in hand specimen to be plagioclase. Augite crystals are mainly <0.7m long, are entirely fresh, and make up at least 15 modal% of the rock. Most augites occur in multi-crystal clots, sometimes intergrown with altered olivine phenocrysts. The latter make up probably 2-3 modal% of the sample, and are always replaced by fine-grained silica, or by coarser calcite. Many olivines contain small chromite crystals. The groundmass of this sample is a formerly glass-rich intergrowth of tiny chloritized mafic laths (augite) and altered plagioclase set in brownish devitrified glass. A few veinlets composed of calcite and quartz cut the rock, and several en echelon shear fractures are filled by calcite, chlorite, bright yellow epidote, and strained quartz. This is quite clearly a typical Hellyer Basalt petrographically.

SAMPLE NUMBER: 626673 MAC 40 700.25m
SUMMARY DESCRIPTION:

The protolith of this sample was an augite+olivine-phyric basaltic lava almost identical to the previous sample. The only significant differences are that this rock shows more intense alteration and veining than 626672. Augite phenocrysts are abundant and fresh, and less abundant olivine is always altered to either fine-grained silica and chlorite, or calcite, or both. The groundmass is finer-grained than 626672, but otherwise mineralogically and texturally identical. The groundmass is strongly altered and bleached in cm-sized domains in which augite and chlorite are leached out and epidote and calcite are far more abundant than less altered areas of groundmass. Veining is mainly quartz-chlorite-epidote assemblages.

SAMPLE NUMBER: 626674 MAC 40 881.0m (clast in volcaniclastic)
SUMMARY DESCRIPTION:

This is a weakly hydrothermally altered, originally glassy plagioclase-phyric dacitic lava. Well-formed albitized plagioclase phenocrysts make up around 5 modal% of this rock, and are always replaced by very fine-grained sericite. A few small former augite phenocrysts are replaced by chlorite, and occasional former FeTi oxide microphenocrysts by leucoxene. The glassy groundmass has recrystallized to a fine-grained sugary quartzo-feldspathic intergrowth in which all feldspar is replaced by sericite. Calcite is common in veinlets, and spots overprinting groundmass. A minor amount of disseminated pyrite is present in this sample.

SAMPLE NUMBER: 626675 MAC 40 917.9m
SUMMARY DESCRIPTION:

This sample is an almost aphyric, moderately hydrothermally altered acid andesite to dacite lava. A few small albitized and sericitized plagioclase phenocrysts are present, but there are no convincing relics of former mafic silicate phenocrysts. Occasional former FeTi oxide phenocrysts are replaced by fine-grained magnetite(?), chlorite and epidote-sphene. The groundmass of this rock was glassy to vitrophyric, and where least altered retains a texture suggestive of tiny plagioclase microlites set in very fine-grained quartz-feldspar-chlorite-sericite. Narrow quartz-pyrite veinlets are transected by calcite veinlets. The more abundant chlorite in the groundmass, and the presence of not uncommon small apatite crystals suggests that this dacite may be closer to the andesitic end of the dacite spectrum than rhyolite the end.

SAMPLE NUMBER: 626682 MAC 40 1020.95m

SUMMARY DESCRIPTION:

This sample is a plagioclase-phyric andesitic lava, typical of the Que Footwall Andesites, in which the 5-8 modal% of plagioclase phenocrysts have been albitized, then heavily replaced by sericite. Most crystals were 0.5-1mm long and subhedral to euhedral. There is no evidence for the former presence of augite phenocrysts in this sample, and former FeTi oxide phenocrysts are notably uncommon and replaced by leucoxene. The groundmass of this rock is a quartz-albite intergrowth mottled by trails and patches of chlorite, and clearly was originally glassy. Small patches of calcite overprint the groundmass, and disseminated very small pyrite crystals are present, but volumetrically insignificant. The weak hydrothermal alteration in this sample is sericite-pyrite.