

Structural and stratigraphic framework of the Kerr-Addison deposit

N. St-Jean¹, J. Blackwell², R. L. Sherlock¹, B. Lafrance¹

¹Metal Earth, MERC, Harquail School of Earth Sciences, Laurentian University, Sudbury, ON, ²Long Point Geologic Ltd. Kamloops, BC

INTRODUCTION

This study is examining the structural and stratigraphic framework of the Larder Lake group which hosts the Kerr-Addison and Chesterville deposits. The Larder Lake group is the main host of gold deposits along this segment of the LLCDZ, including the world-class Kerr-Addison and Chesterville deposits (~11 million ounces at 9 g/t Au production; Smith et al. 1990). These units consist of complex intercalations of ultramafic and mafic volcanic rocks, and associated sedimentary rocks, and At the Kerr-Addison Mine, a thick package of Larder Lake group is preserved, making it an ideal location to study the stratigraphic and structural framework of the rocks, which was the focus of the 2017 field work.

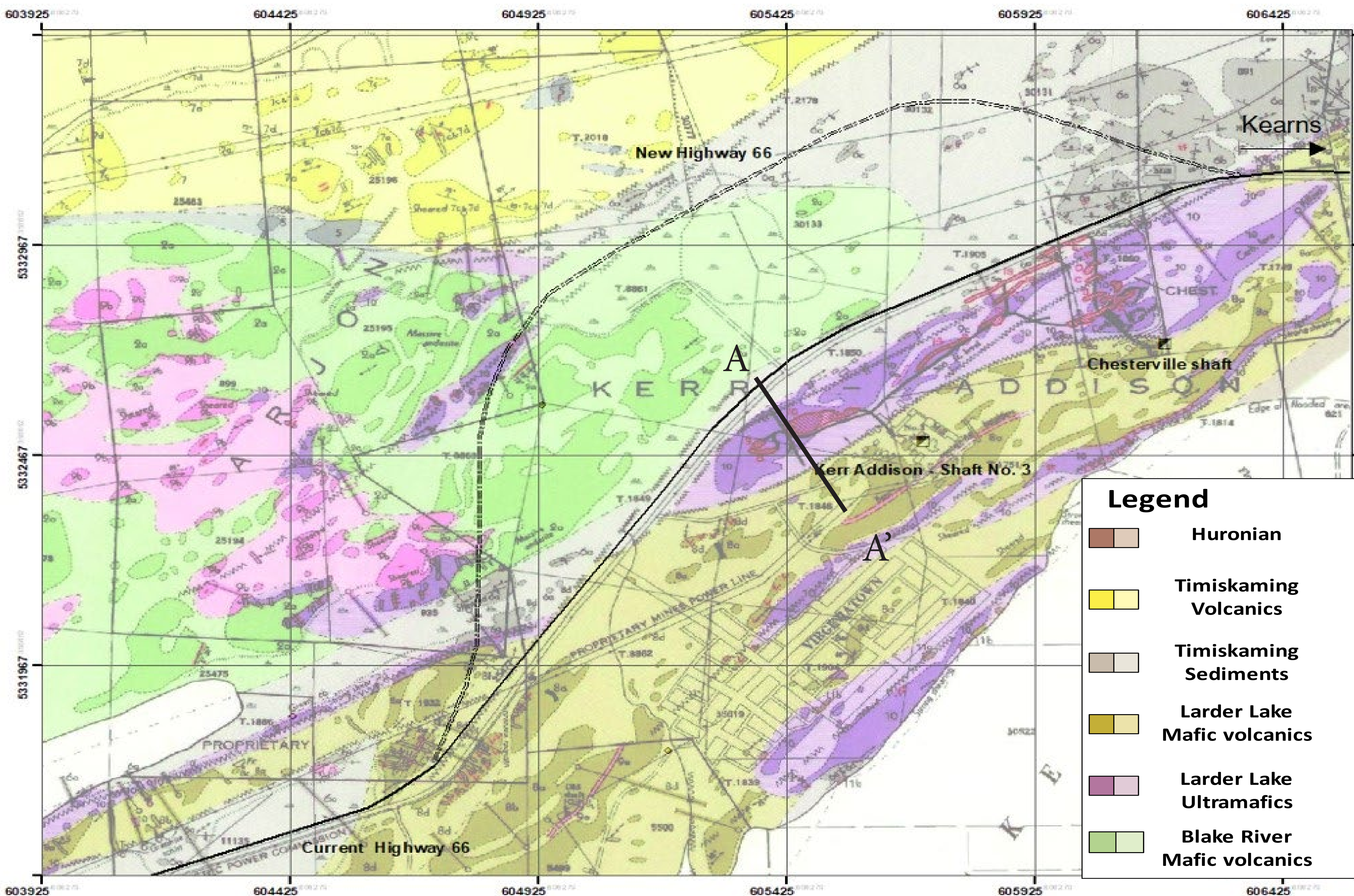


Figure 1. Geology and location of the study area (modified from Thomson 1941a, 1941b), showing the location of the new highway bypass and cross-section line of Figure 2. Universal Transverse Mercator co-ordinates provided using North American Datum 1983 (NAD83) in Zone 17N.

LOCAL GEOLOGY

This study lies along the Larder Lake-Cadillac deformation zone (LLCDZ). The LLCDZ, in Larder Lake, separates older metavolcanic rocks in the south, consisting of the Larder Lake Group (ca. 2705 Ma, Corfu et al., 1989), from younger metavolcanic rocks in the north, part of the Blake River Group assemblage (2704 - 2695 Ma, Thurston et al., 2008). South of Highway 66, in Virginiatown, are the Larder Lake group ultramafic and mafic volcanic rocks (Figure 1), which are unconformably overlain to the southeast by Huronian Supergroup sedimentary rocks. North of Highway 66, the LLCDZ juxtaposes younger Timiskaming sedimentary rocks with the Larder Lake group metavolcanics. This break is associated with intense carbonatization of all host rocks and has a strong foliation that is generally east-west trending (Thomson 1941a, 1941b, 1943).

TIMISKAMING CONTACT ZONE

A notable feature, which was consistently mapped and logged in drill core on the western side of the Kerr-Addison property, is the presence of a transition zone between the Timiskaming sandstone-mudstones and ultramafic rocks of the Larder Lake group. This zone is 2 to 4 m thick and is characterized by a mixed zone of ultramafic lenses and quartz-feldspathic-matrix clastic sedimentary rocks. The varying degrees of strain have overprinted all primary textures and the challenge lies in determining whether this contact is a result of structural interleaving of 2 units or whether this was a depositional contact that was later overprinted by ductile deformation. Detailed sampling was collected to attempt to characterize the transition zone and shed light on the nature of the contact. Preliminary petrography results indicate a sharp contact between the Timiskaming and the volcanics.

North

South

A

LEGEND

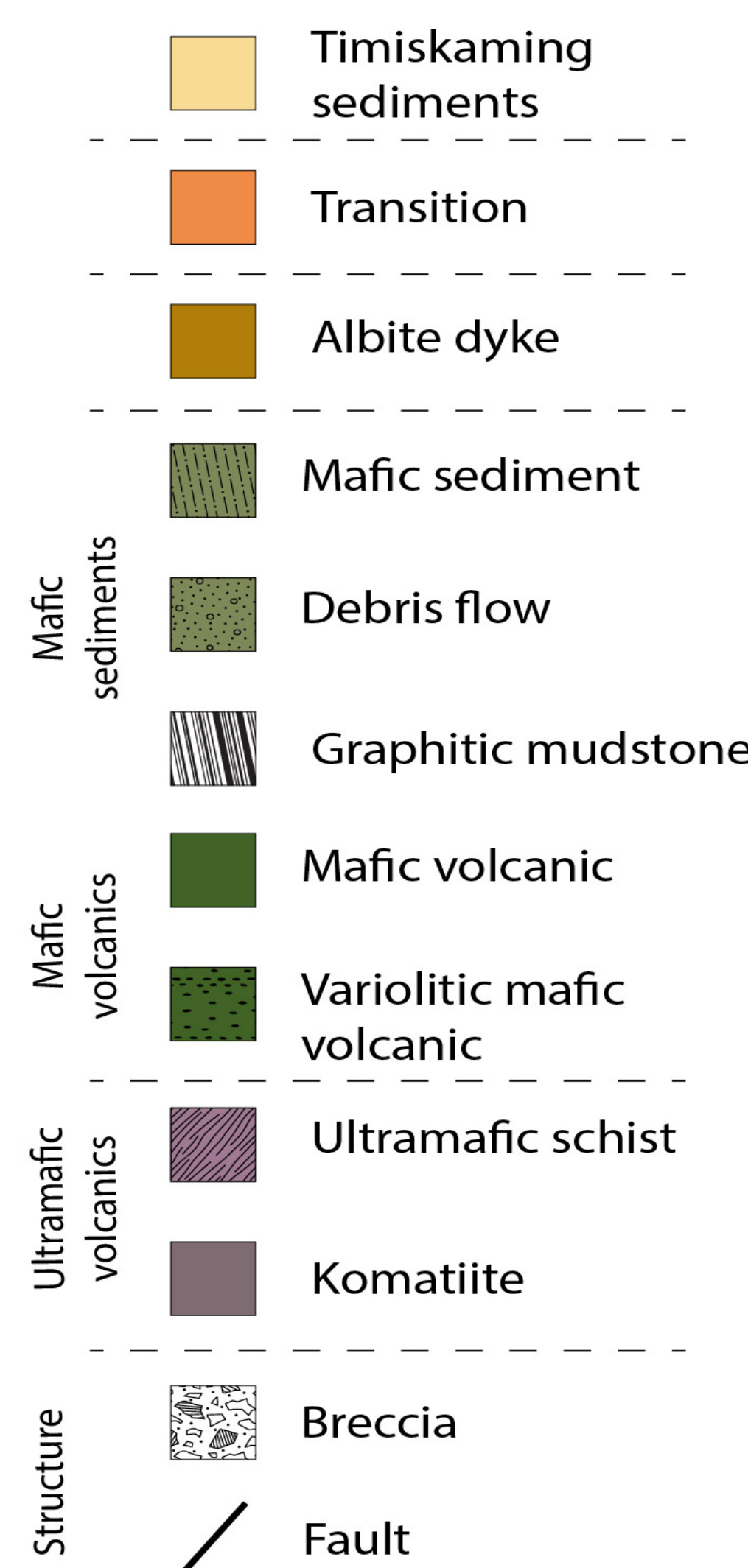


Figure 2. Cross-section A - A' through Larder Lake group stratigraphy and Timiskaming contact.

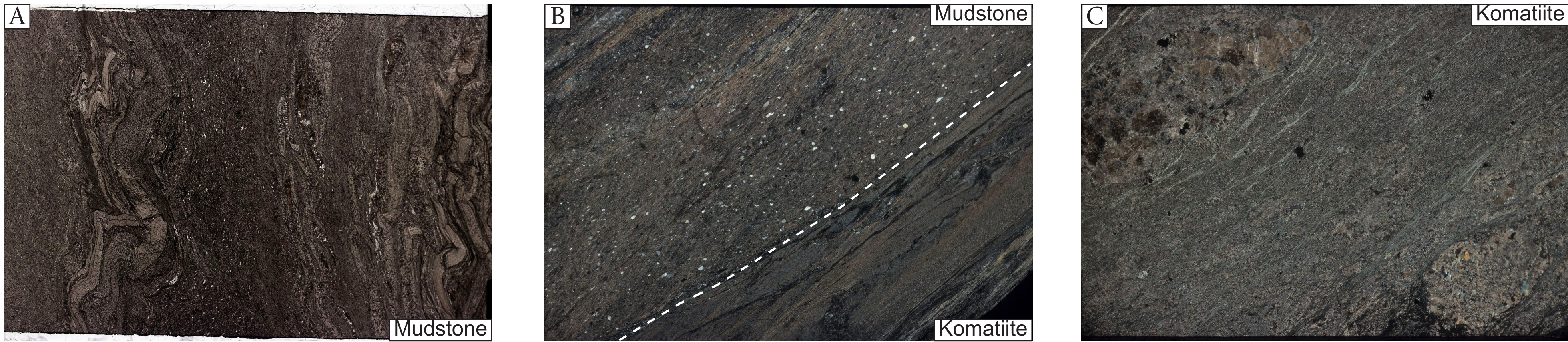


Figure 3. Photo-micrographs of lithological units at the Timiskaming-Larder Lake contact zone from hanging wall to footwall in order: A, B, C. A) Fine grain, kink folded Timiskaming mudstone-siltstone. B) Contact between mudstone and komatiite. C) Fine grain, foliated komatiite (chlorite-quartz-carbonate alteration assemblage).

GOLD MINERALIZATION

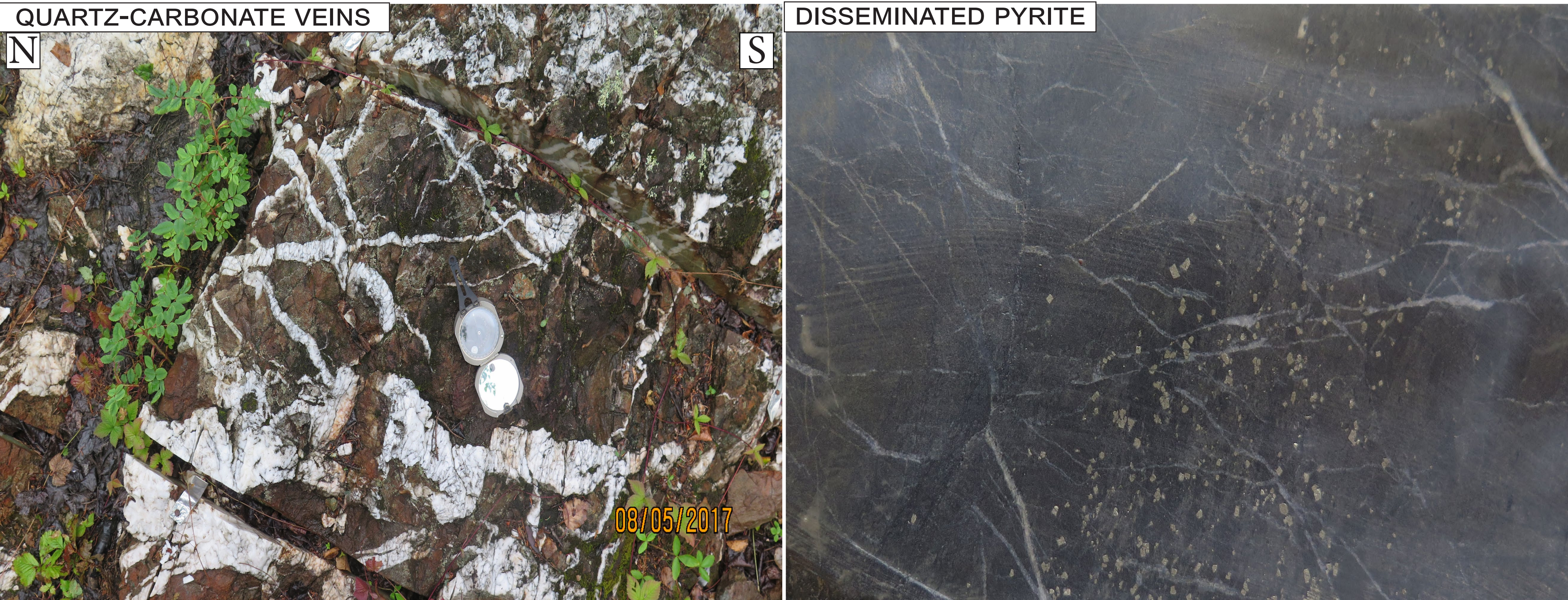


Figure 3. Two styles of gold mineralization at the Kerr-Addison deposit: Quartz-carbonate veins hosted by ultramafic volcanics (left) and gold-bearing, disseminated pyrite hosted by mafic volcanics (right).

PROJECT GOALS

The project seeks to characterize the internal lithostratigraphy and structural deformation of the Larder Lake group. The main purpose of the thesis will be to determine whether the Larder Lake group is a thrust sliver of deeper metavolcanic rocks that has been structurally emplaced or whether it formed in situ and shares a disconformable contact with the Timiskaming sediments. This contact relationship will be critical to understanding the nature of the LLCDZ. The approach will involve detailed (1:2000 scale) structural and lithological mapping augmented by drill core logging along key cross-sections.

LLCDZ - TIMISKAMING/LARDER-LAKE CONTACT



Figure 4. Contact between Timiskaming sediments and Larder Lake Group ultramafic volcanics in drill core (left, NQ drill core) and outcrop (right, west of Virginiatown, Ontario). Location: 604824E 5332042N (UTM co-ordinates are in NAD83, Zone 17N).

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