

# DUKE GEOLOGICAL LABORATORY

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Client Sample No. 10743A/B-11W	Dukelabs Sample No. N838	Classification: Diabase
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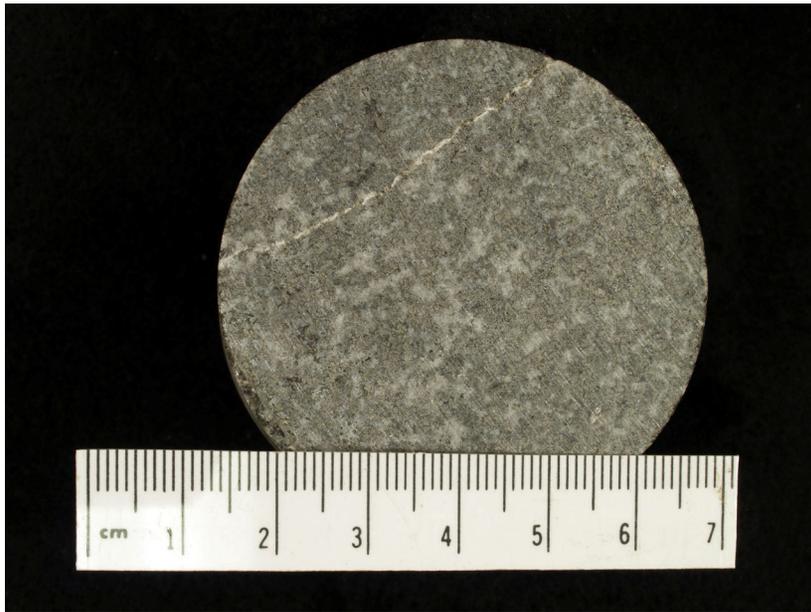
**Color Index (% mafic and opaque phases):** 60

**Megascopic Sample Description:** Dark gray, medium- to coarse-textured and dense, rock with intergrown plagioclase feldspar and pyroxene as the primary constituents. Greenish tints are found in the more highly altered areas of the rock mass. The rock displays classic mottled texture (diabasic or ophitic) where lath-like crystals of plagioclase feldspar are intergrown into angular networks with clinopyroxene filling the interstices of the feldspars. Quartz, K-feldspar, and opaque minerals (mostly magnetite) are also present in decreasing quantities.

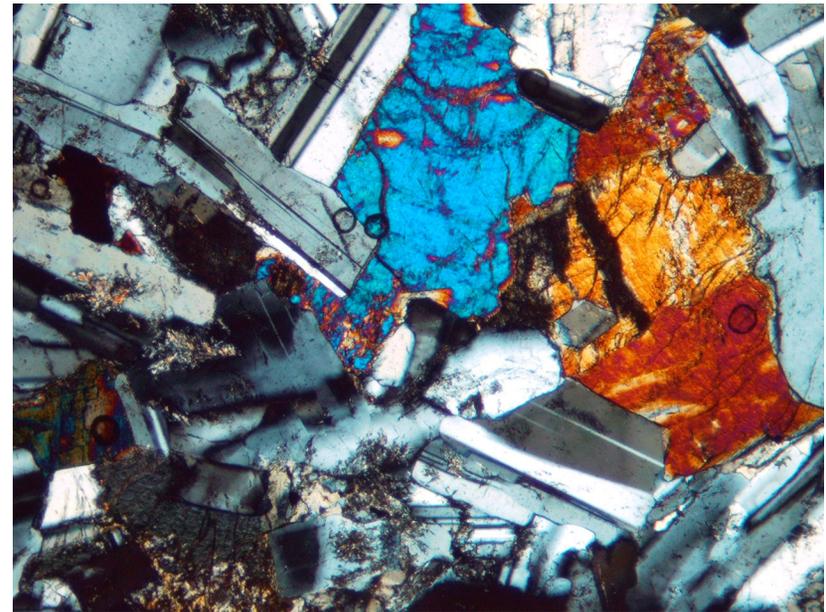
**Brief Petrographic Description:** Labradorite and augite intergrown in a diabasic texture with subordinate quartz, K-feldspar, opaques (mostly magnetite), and amphibole along with trace amounts of biotite, chlorite, and apatite.

Mineral Phase	Crystal Size (mm)	Volume %	Mohs Scale	Comments
Pyroxene	1.0-5.0	57	5.0-6.0	Augite in euhedral- to subherdral twinned crystals
Plagioclase	0.5-1.5	34	6.0	Labradorite (~An55) in interlocking twinned and often zoned lath-like crystals
Quartz	0.25	4	7.0	Interstitial anhedral small crystals
K-Feldspar	0.25	2	6.0	Small untwinned crystals
Opagues	0.05-2.5	2	~5.0	Disseminated and large euhedral crystals
Amphibole	0.25	1	5.0-6.0	Colorless to light green amphibole replacing pyroxene
Biotite	0.1	tr	2.5-3.0	Intergrown with chlorite at edges of some pyroxenes
Chlorite	0.1	tr	2.0-2.5	Intergrown with biotite at edges of some pyroxenes
Apatite	0.05	tr	5.0	Accessory crystals

## Macro and Petrographic Images



**Figure 1** – Image of sawn core from which thin section was made. Rock displays a medium- to coarse texture consisting predominately of intergrown pyroxene (dark) and plagioclase (light) phases. Note thin vein of calcite cutting across upper left part of sawn core. Greenish tints are the result of alteration to amphibole and chlorite. Thin section cut from depth of 3.95'.



**Figure 2** - Photomicrograph showing interstitial growth of twinned clinopyroxenes (large crystals of augite with blue and orange interference colors) grown in angular areas between zoned and twinned lath-like crystals of plagioclase feldspar. The feldspar is slightly weathered, internally altered to clay and sericite in some crystals. Note the triangular arrangement of feldspar crystals, typical of diabasic texture.

**Note:** Petrographic Image (Width of Field = 1.6 mm)

## Petrographic Description and Rock Mass Properties

Sample **N838** consists mostly of pyroxene and plagioclase feldspar in roughly equal proportions. The pyroxene is predominately augite and shows abundant twinning. The pyroxene is intimately associated with plagioclase to produce a diabasic texture consisting of intergrown lath-like crystals of plagioclase with the pyroxenes formed at the often angular interstices of the feldspars. The feldspars are labradorite (~An55) and show typical polysynthetic twinning and often show oscillatory zoning. The feldspars are somewhat weathered and thus altered and replaced by fine intergrowths of clay and sericite. Clinopyroxene, although less weathered, shows slight alteration to colorless amphibole (?) along exsolution lamellae.

In addition to the primary phases, subordinate K-feldspar, quartz and amphibole also occur throughout the rock and small amounts of opaque minerals occur as disseminated crystals and larger euhedral crystals. Chlorite and biotite occur in trace amounts along with the accessory mineral apatite.

The rock mass is slightly weathered based on the condition of both the feldspars and clinopyroxenes. Overall, the rock is dense and tough to break and is representative of the world-renowned mafic Palisades intrusive sheet which is continuously exposed along the east edge of the Newark Basin from west of Haverstraw, New York southwestward to Staten Island, New York City.



**Petrographer:** Charles Merguerian, Ph.D.

**Filename:** N838 DGL Petro Report.doc