



November 13, 2024

12606.05

Arvin Babu
1875 Mountain View Drive
Belvedere, CA 94920
ab@miyakma.com

Geotechnical Report Update, Proposed Deck, 2199 Diamond Mountain Road, Calistoga, California

Dear Mr. Babu:

Brunsing Associates, Inc. (BAI) is pleased to present this update to our previous geotechnical investigation report dated February 8, 2022, for the cabin located at the property, 2199 Diamond Mountain Road, Calistoga, California. Based on information provided by you, we understand that the proposed deck will be constructed adjacent to the cabin which is under construction at the address noted above. The deck location is shown on the Site Map, Plate 1.

Previous Reconnaissance and Investigation

The subsurface exploration and geologic reconnaissance for the cabin was conducted on December 8, 2021. BAI's principal engineering geologist performed a geologic reconnaissance consisting of examination of bedrock and soil exposed on the ground surface and interpretation of geomorphic expressions within the property and vicinity. The subsurface exploration consisted of logging and sampling three exploratory test borings, B-1 through B- 3. The test borings were drilled to depths of 2.5 to 12 feet below the ground surface, with a light portable drill rig using 4-inch diameter flight augers. Our staff geologist made a descriptive log of each test boring and obtained relatively undisturbed (tube) samples of the soil and bedrock materials encountered for visual classification and laboratory testing.

Current Reconnaissance and Investigation

BAI's Senior engineering geologist, Joshua Kilgore conducted a subsurface investigation in the area of the proposed deck. The subsurface exploration consisted of logging and sampling two exploratory test borings, B-4 through B-5. The boring locations are shown on Plate 1. The test borings were drilled to depths of 7 to 9.5 feet below the ground surface, with a light portable drill rig using 4-inch diameter flight augers. Our geologist made a descriptive log of each test boring and obtained relatively undisturbed (tube) samples of the soil and bedrock materials encountered for visual classification and laboratory testing. Logs of the test borings are presented on Plates 2 and 3. The soils are classified in accordance with the Unified Soil Classification System outlined on Plate 4. The various descriptive properties used to describe the soils and bedrock are listed on Plates 5 and 6, respectively.



Subsurface Conditions (Area of Proposed Deck)

Our subsurface investigation in the area of the proposed deck encountered weak soil deposits consisting of undocumented fill which extended between two and three feet below the ground surface. The weak soils consisted of sandy silts which were dry and medium stiff to very stiff with gravel to cobble size rock fragments. Underlying the undocumented fill our exploration encountered bedrock composed of gray to brown tuff of the Pliocene Sonoma Volcanic Group which extended to the maximum depth explored (9 ½ below the ground surface). The bedrock was closely fractured, friable and deeply weathered.

Updated Recommendations

As applicable, our previous report recommendations for grading, foundations and drainage remain valid and suitable for design, with the following updated recommendations. Based on the information provided by TruNorth, the deck may be supported on a drilled pier foundation system according to the recommendations provided below.

Drilled Pier Foundations

The proposed deck can be supported on drilled, cast-in-place concrete piers. Grade beams can be used if needed. Drilled piers should be at least 12 inches in diameter and should be embedded a minimum of 5 feet into supporting bedrock, as determined by BAI. Piers adjacent to a slope face should be bottomed so that the downhill portion of the supporting part of the pier is at least 7 feet horizontal distance from face of adjacent slope. The bedrock was encountered at approximately two to three feet within our test borings. The drilled piers should be at least seven to eight feet in depth. Pier depths and diameter should be determined by a structural engineer based on our recommendations.

Pier spacing should be no closer than three pier diameters, center to center. The drilled piers should be designed to gain support from skin friction. A skin friction value of 500 pounds per square foot (psf) of shaft area may be used in the supporting bedrock, for dead loads plus live loads. For total downward loads due to wind or seismic forces, the pier capacity can be increased by one third. Uplift frictional capacity for piers should be limited to 2/3 of the allowable downward capacity. When final pier depths have been achieved, as determined by BAI, the bottoms of the pier holes should be cleaned of loose materials. BAI should observe the drilling and final clean out of the pier holes, prior to the placement of reinforcing steel.

Resistance to lateral loads can be obtained using passive earth pressure against the face of the foundations. An allowable passive pressure of 300 psf (rectangular distribution) can be used within the supporting soil. Passive pressure should be neglected within the upper three feet of weak soils. Passive pressure can be projected over two pier diameters.

Seismic Design Criteria

The structure should be designed and/or constructed to resist the effects of strong ground shaking (on the order of Modified Mercalli Intensity IX) in accordance with current building codes. The



California Building Code (CBC) 2022 edition indicates that the site classification for the property is Site Class C. CBC indicates that the following seismic design parameters are appropriate for the site:

Table 1: Seismic Design Parameters

Site Class	=	C
Mapped Spectral Response Acceleration at 0.2 sec	$S_s =$	1.906g
Mapped Spectral Response Acceleration at 1.0 sec	$S_1 =$	0.712g
Modified Spectral Response Acceleration at 0.2 sec	$S_{MS} =$	2.287g
Modified Spectral Response Acceleration at 1.0 sec	$S_{M1} =$	0.997g
Design Spectral Response Acceleration at 0.2 sec	$S_{DS} =$	1.525g
Design Spectral Response Acceleration at 1.0 sec	$S_{D1} =$	0.664g
Site Coefficient	$F_a =$	1.2
Site Coefficient	$F_v =$	1.4
Long Period Transition Period	$T_L =$	8
Seismic Design Category	=	D

If you have any questions, please contact Brunsing Associates, Inc. at (707) 528-6108.

Respectfully submitted,



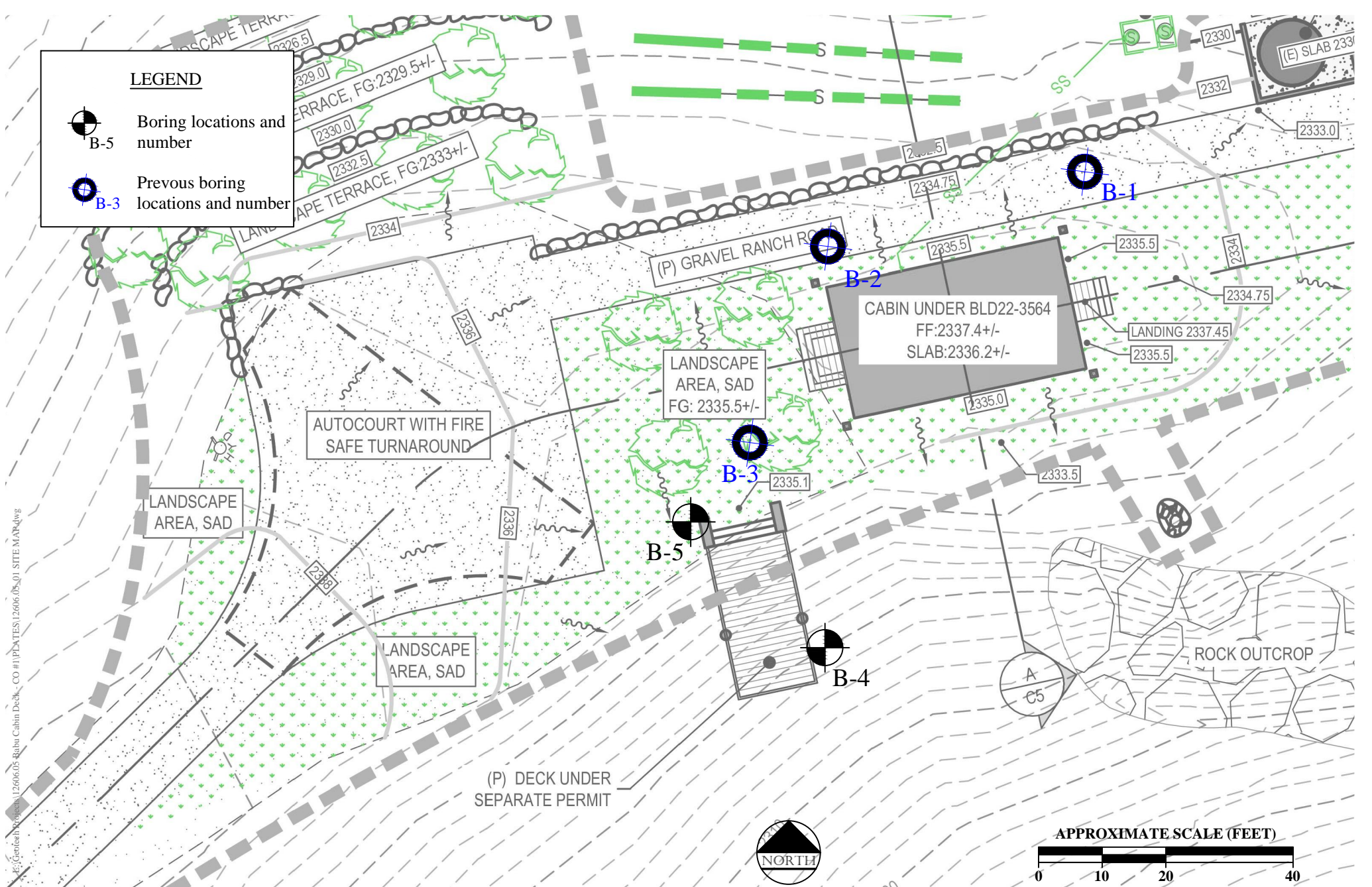
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Date: 11/13/24

SITE MAP

BABU DECK

2199 Diamond Mountain Road
Calistoga, California

PLATE

1

Sampler Type*

Blows/foot

Depth (ft.)

Sample

Log of Boring B-4

Equipment: Little Beaver MDL-5B, 4-inch solid stem flight auger

Date: 8/27/24

Logged By: JNK

Elevation: 2320 feet *** Latitude: 38.539668 Longitude: -122.584218

CA

5 **

CA

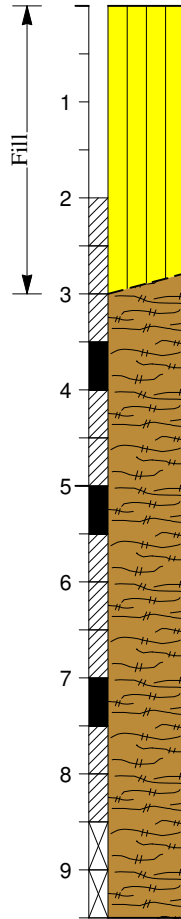
20 **

CM

15 **

SPT

20



GRAY-BROWN SANDY SILT (ML) WITH GRAVEL AND COBBLES
soft to medium stiff, dry

PALE GRAY TUFF
closely fractured, friable, deeply weathered

Notes:
1. No free water encountered
2. No caving

BORING LOG 1 PER PAGE, 12606.05 GINT.GPJ, 11/13/24

Latitude/Longitude estimated from Google Earth.
* See Soil Classification Chart & Key to Test Data
** Equivalent "Standard Penetration" Blow Counts.
*** Elevations interpolated from Plate 2.

Scale: 1" = 2'



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LOG OF BORING B-4
BABU DECK
2199 Diamond Mountain Road
Calistoga, California

PLATE
2

SHEET 1 of 1

Sampler Type*

Blows/foot

Depth (ft.)
Sample

Log of Boring B-5

Equipment: Little Beaver MDL-5B, 4-inch solid stem flight auger

Date: 8/27/24

Logged By: JNK

Elevation: 2335 feet *** Latitude: 38.539711 Longitude: -122.584315

CA

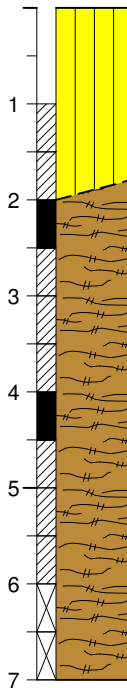
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CM

10 **

SPT

8



LIGHT MEDIUM BROWN SANDY SILT (ML)
medium stiff to very stiff, dry to moist
with gravel and cobble

BROWN TO LIGHT BROWN WEATHERED TUFF
closely fractured, friable, deeply weathered

Notes:

1. No free water encountered
2. No caving

BORING LOG 1 PER PAGE, 12606.05 GINT.GPJ, 11/13/24

Latitude/Longitude estimated from Google Earth.
* See Soil Classification Chart & Key to Test Data
** Equivalent "Standard Penetration" Blow Counts.
*** Elevations interpolated from Plate 2.

Scale: 1" = 2'



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LOG OF BORING B-5
BABU DECK
2199 Diamond Mountain Road
Calistoga, California

PLATE
3

SHEET 1 of 1

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)	MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
				GRAPHIC	LETTER	
	COARSE-GRAINED SOILS	GRAVELS AND GRAVELLY SOILS	CLEAN GRAVELS (Less than 5% fines)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
					GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GRAVELS WITH FINES (Greater than 12% fines)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
		SAND AND SANDY SOILS	CLEAN SANDS (Less than 5% fines)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
					SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SANDS WITH FINES (Greater than 12% fines)		SM	SILTY SANDS, SAND-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
				SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH
	CH	INORGANIC CLAYS OF HIGH PLASTICITY				
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS				
	PT	PEAT, HUMOUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS				
	HIGHLY ORGANIC SOILS					

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

KEY TO TEST DATA

LL - Liquid Limit

Consol - Consolidation

Shear Strength, psf

Confining Pressure, psf

PI - Plasticity Index

EI - Expansion Index

Tx 1564 (1440) - Unconsolidated Undrained Triaxial

Sample Retained

SA - Sieve Analysis

TxCU 1564 (1440) - Consolidated Undrained Triaxial

Sample Recovered, Not Retained

DS 2020 (1440) - Consolidated Drained Direct Shear

Bulk Sample

FVS 520 - Field Vane Shear

Sample Not Recovered

UC 1500 - Unconfined Compression

CA - California Modified Split Barrel Sampler 3.0-inch O.D.

PP 1500 - Field Pocket Penetrometer

CM - California Modified Split Barrel Sampler 2.5-inch O.D.

Sat - Sample saturated prior to test

SPT - California Split Barrel Sampler 2.0-inch O.D.

SH - Shelby Tube

Initial Groundwater Level Reading

RC - Rock Coring

Second Groundwater Level Reading

Recovery - Percent Core Recovered

RQD - Rock Quality Designation (length of core pieces >= 4-inches / core length)

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SOIL CLASSIFICATION CHART & KEY TO TEST DATABABU DECK
2199 Diamond Mountain Road
Calistoga, California**PLATE****4**

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Relative Density	Standard Penetration Test Blow Count (blows per foot)
Very loose	4 or less
Loose	5 to 10
Medium dense	11 to 30
Dense	31 to 50
Very dense	More than 50

CONSISTENCY OF FINE-GRAINED SOILS

Consistency	Identification Procedure	Approximate Shear Strength (psf)
Very soft	Easily penetrated several inches with fist	Less than 250
Soft	Easily penetrated several inches with thumb	250 to 500
Medium stiff	Penetrated several inches by thumb with moderate effort	500 to 1000
Stiff	Readily indented by thumb, but penetrated only with great effort	1000 to 2000
Very stiff	Readily indented by thumb nail	2000 to 4000
Hard	indented with difficulty by thumb nail	More than 4000

NATURAL MOISTURE CONTENT

Dry	No noticeable moisture content. Requires considerable moisture to obtain optimum moisture content* for compaction.
Damp	Contains some moisture, but is on the dry side of optimum.
Moist	Near optimum moisture content for compaction.
Wet	Requires drying to obtain optimum moisture content for compaction.
Saturated	Near or below the water table, from capillarity, or from perched or ponded water. All void spaces filled with water.

* Optimum moisture content as determined in accordance with ASTM Test Method D1557, latest edition.

Where laboratory test data are not available, the above field classifications provide a general indication of material properties; the classifications may require modification based upon laboratory tests.



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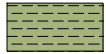






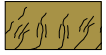


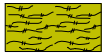

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SOIL DESCRIPTIVE PROPERTIES

BABU DECK
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PLATE
5

Generalized Graphic Bedrock Symbols

	Claystone		Siltstone		Tuff (Volcanic Ash)
	Shale		Chert		Andesite
	Sandstone		Serpentine		Basalt
	Conglomerate		Greenstone		Schist

Stratification

Bedding of Sedimentary Rocks

Massive
Very thick bedded
Thick bedded
Thin bedded
Very thin bedded
Laminated
Thinly laminated

Thickness of Beds

No apparent bedding
Greater than 4 feet
2 feet to 4 feet
2 inches to 2 feet
0.5 inches to 2 inches
0.125 inches to 0.5 inches
less than 0.125 inches

Fracturing

Fracturing Intensity

Little
Occasional
Moderate
Close
Intense
Crushed

Fracture Spacing

Greater than 4 feet
1 foot to 4 feet
6 inches to 1 foot
1 inch to 6 inches
0.5 inches to 1 inch
less than 0.5 inches

Strength

Soft
Friable
Low hardness
Moderate hardness
Hard
Very hard

Plastic or very low strength.
Crumbles by hand.
Crumbles under light hammer blows.
Crumbles under a few heavy hammer blows.
Breaks into large pieces under heavy, ringing hammer blows.
Resists heavy, ringing hammer blows and will yield with difficulty only dust and small flying fragments.

Weathering

Deep	Moderate to complete mineral decomposition, extensive disintegration, deep and thorough discoloration, many extensively coated fractures.
Moderate	Slight decomposition of minerals, little disintegration, moderate discoloration, moderately coated fractures.
Little	No megascopic decomposition of minerals, slight to no effect on cementation, slight and intermittent, or localized discoloration, few stains on fracture surfaces.
Fresh	Unaffected by weathering agents, no disintegration or discoloration, fractures usually less numerous than joints.



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BEDROCK DESCRIPTIVE PROPERTIES

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PLATE

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