UCS and petrographic samples for B-1 and B-2: B-1-100.4, B-1-285.3, B-1-312.0, B-2-133.6, B-2-138.0, B-2-168.3, B-2-211.1, B-2-236.9, B-2-421.0, B-2-586.9, B-2-666.0, B-2-786.9

UCS and petrographic samples for B-3 and B-4: B-3-93.0, B-3-279.8, B-3-293.0, B-3-379.1, B-4-47.8, B-4-200.8, B-4-215.0, B-4-301.5, B-4-391.4

UCS and petrographic samples for B-5 and B-6: B-5-109.0, B-5-145.1, B-5-310.7, B-5-385.7, B-5-410.7, B-6-149.3, B-6-239.9, B-6-281.9

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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPET Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-1	Tested By:	GW
Sample ID/Depth	B-1-100.7	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

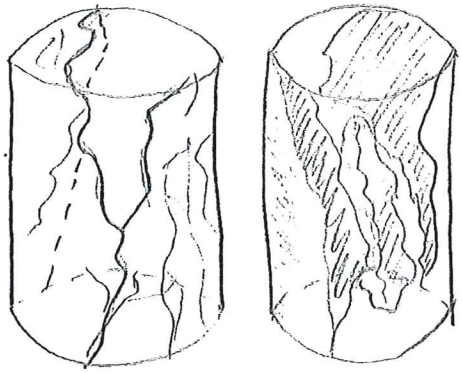
Sample Description: _____

COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-1-100.7	6893-5	11/04/2009	5.04	2.38	64820	4.45	14570	radial

Remarks: _____

Images:



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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-1	Tested By:	GW
Sample ID/Depth	B-1-285.3	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

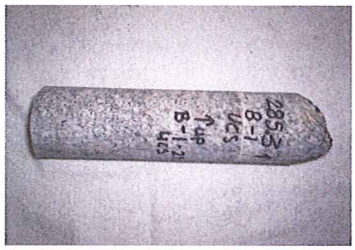
Sample Description: _____

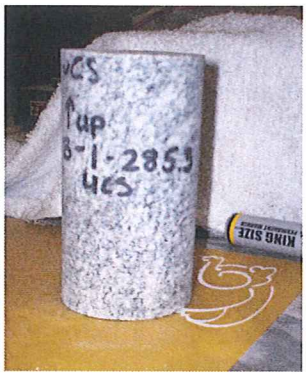
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

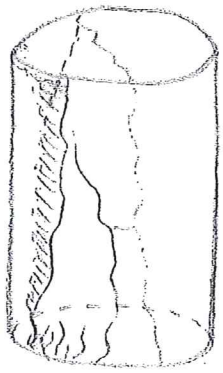
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-1-285.3	6893-23	11/10/2009	4.79	2.4	22600	4.52	5000	radial

Remarks: Fracture indicats poor failure mechanism, resulting in compressive strength that is likely low and non-representative

Images:







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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-1	Tested By:	GW
Sample ID/Depth	B-1-312.0	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

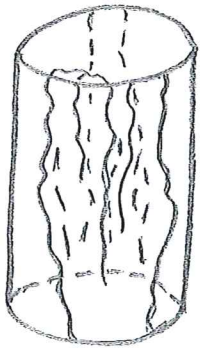
Sample Description: _____

COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-1-312.0	6893-17	11/09/2009	4.93	2.40	40130	4.52	8880	radial

Remarks: _____

Images:



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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-133.6'	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

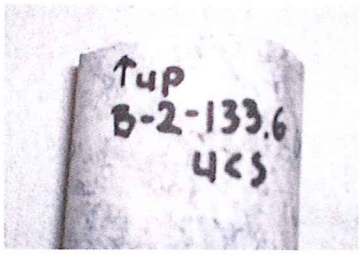
Sample Description: _____

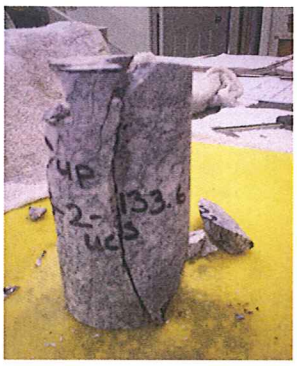
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

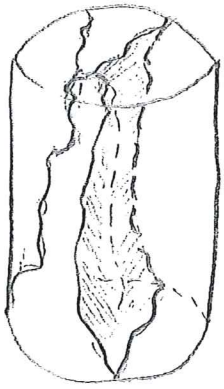
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-133.6	6893-4	11/04/2009	5.11	2.39	39230	4.49	8740	con/rad

Remarks: _____

Images:







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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-138.0	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

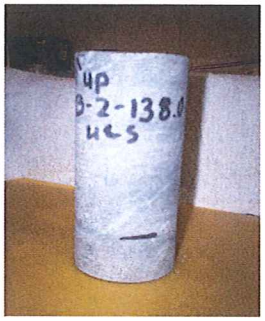
Sample Description: _____

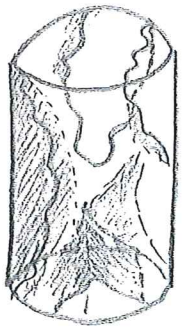
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-138.0	9893-11	11/06/2009	5.09	2.39	74590	4.49	16610	radial

Remarks: _____

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-168.3	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

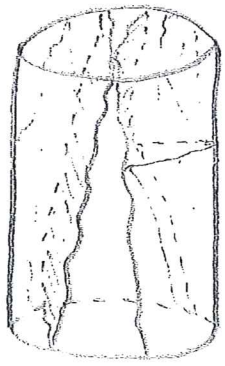
Sample Description: _____

COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-168.3	6893-22	11/10/2009	4.93	2.39	44130	4.49	9830	radial

Remarks: _____

Images:



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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-211.1	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

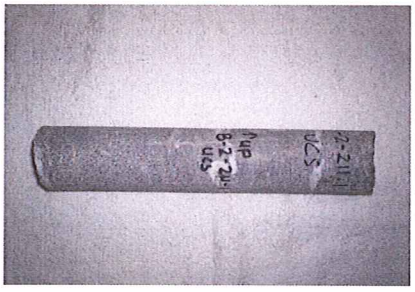
Sample Description: _____

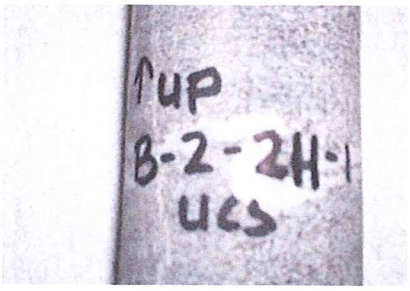
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

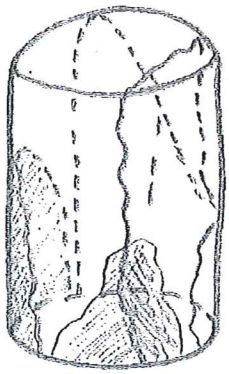
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-211.1	6893-18	11/09/2009	5.03	2.40	44450	4.52	9830	radial

Remarks: _____

Images:







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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-236.9	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

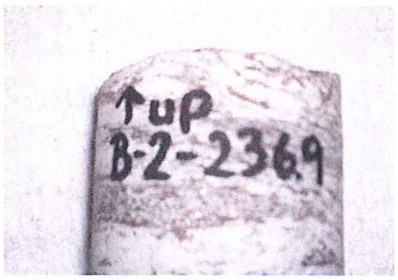
Sample Description: _____

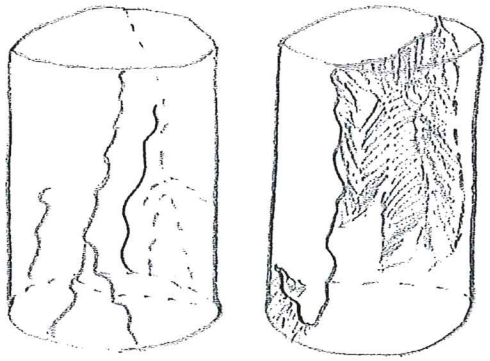
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-236.9	6893-7	11/06/2009	5.07	2.38	35220	4.45	7910	con/rad

Remarks:

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-421.0	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

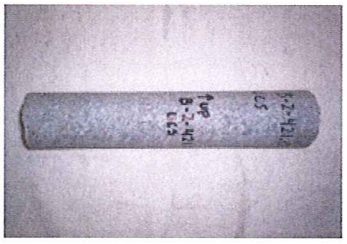
Sample Description:

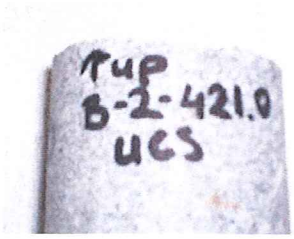
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

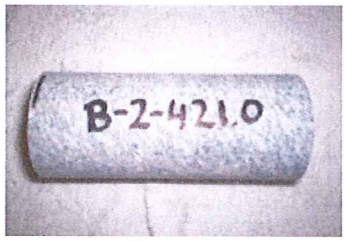
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-421.0	6893-15	11/09/2009	5.05	2.39	52770	4.49	11750	conical

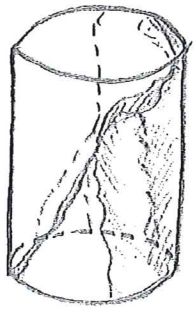
Remarks:

Images:









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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-586.9	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

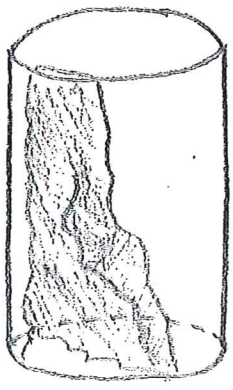
Sample Description: _____

COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-586.9	6893-19	11/09/2009	5.57	2.39	24840	4.49	5530	shear

Remarks: Limited area of shear at top of core, possible low compressive strength result

Images:



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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-666.0'	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

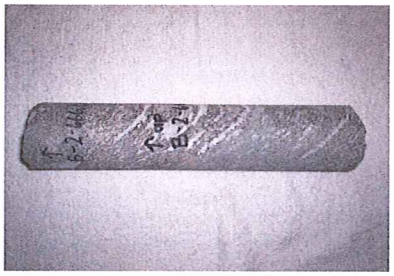
Sample Description: _____

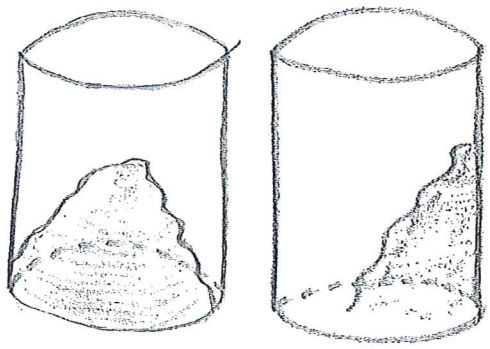
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-666.0	6893-6	11/04/2009	5.01	2.39	13570	4.49	3020	shear

Remarks: Failure visible on existing bedding plane

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-2	Tested By:	GW
Sample ID/Depth	B-2-786.9	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

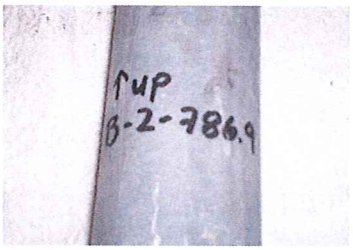
Sample Description: _____

COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-2-786.9	6893-20	11/09/2009	5.07	2.39	30990	4.49	6900	con/rad

Remarks:

Images:



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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-3	Tested By:	GW
Sample ID/Depth	B-3-93.0	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

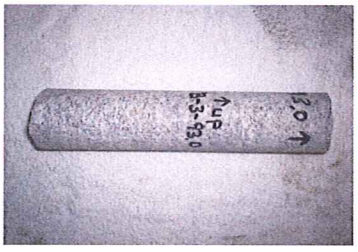
Sample Description:

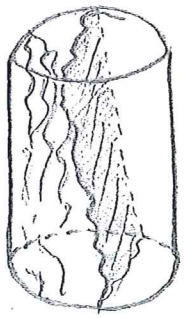
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-3-93.0	6893-9	11/06/2009	4.87	2.39	61950	4.49	13800	radial

Remarks:

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-3	Tested By:	GW
Sample ID/Depth	B-3-279.8	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

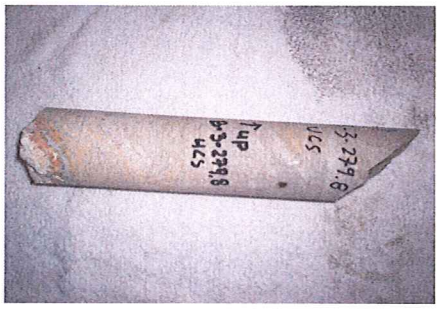
Sample Description:

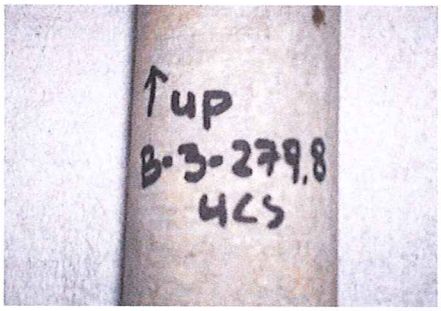
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

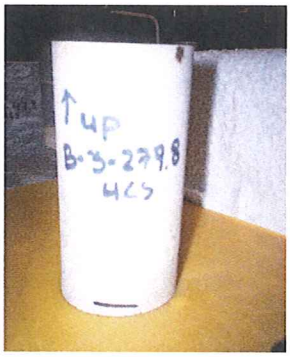
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-3-279.8	6893-10	11/06/2009	5.08	2.40	35960	4.52	7960	conical

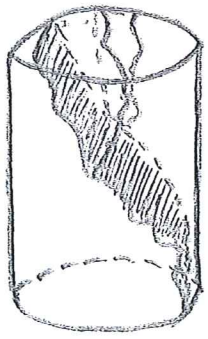
Remarks:

Images:









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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-3	Tested By:	GW
Sample ID/Depth	B-3-295.0	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

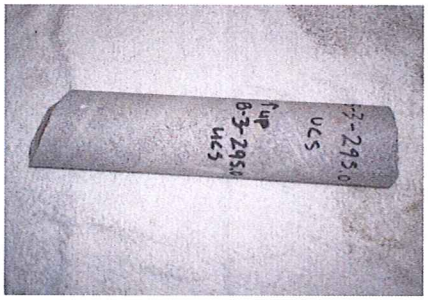
Sample Description:

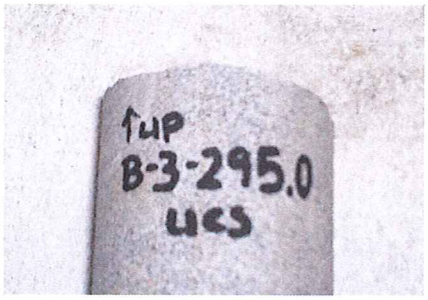
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

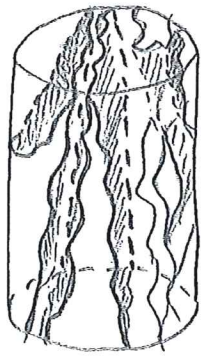
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-3-295.0	6893-12	11/09/2009	4.94	2.40	55730	4.52	12330	radial

Remarks:

Images:







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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-3	Tested By:	GW
Sample ID/Depth	B-3-379.1	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

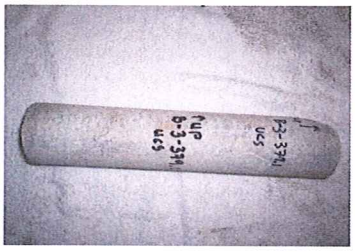
Sample Description:

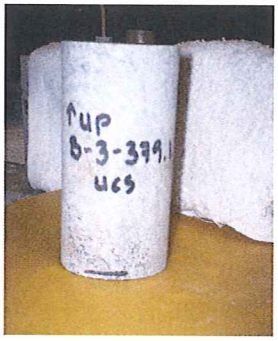
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

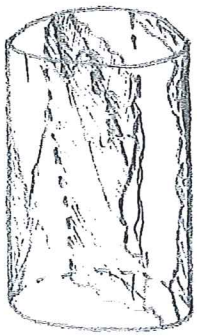
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-3-379.1	6893-25	11/10/2009	5.09	2.39	69530	4.49	15490	radial

Remarks:

Images:







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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-4	Tested By:	GW
Sample ID/Depth	B-4-47.8	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

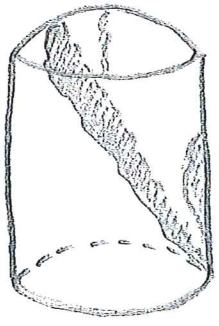
Sample Description: _____

COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-4-47.8	6893-8	11/06/2009	4.97	2.39	37850	4.49	8430	shear

Remarks: _____

Images:



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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-4	Tested By:	GW
Sample ID/Depth	B-4-200.8	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

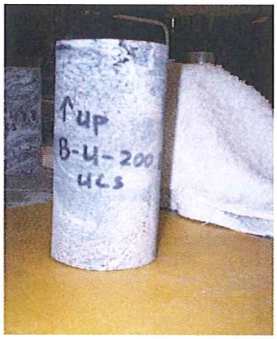
Sample Description: _____

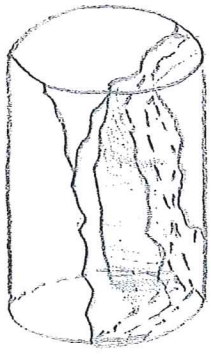
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-4-200.8	6893-24	11/10/2009	5.09	2.39	35450	4.49	7900	radial

Remarks:

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-4	Tested By:	GW
Sample ID/Depth	B-4-215.0	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

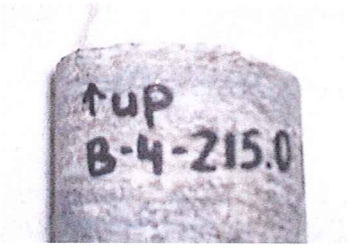
Sample Description:

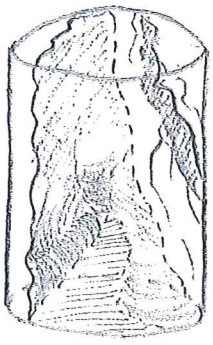
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-4-215.0	6893-26	11/10/2009	5.06	2.4	73040	4.52	16160	radial

Remarks:

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-4	Tested By:	GW
Sample ID/Depth	B-4-301.5	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

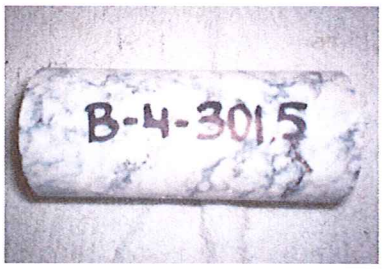
Sample Description: _____

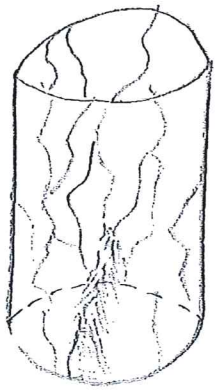
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-4-301.5	6893-8	11/06/2009	4.89	2.39	46980	4.49	10460	radial

Remarks:

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-4	Tested By:	GW
Sample ID/Depth	B-4-391.4	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

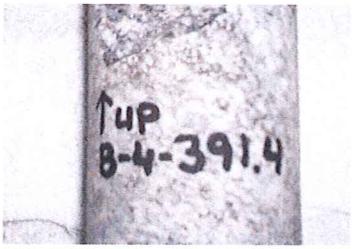
Sample Description:

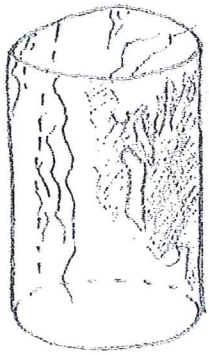
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-4-391.4	6893-13	11/10/2009	4.85	2.39	40760	4.49	9080	radial

Remarks:

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-5	Tested By:	GW
Sample ID/Depth	B-5-109.0'	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

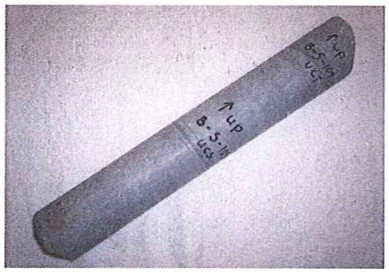
Sample Description:

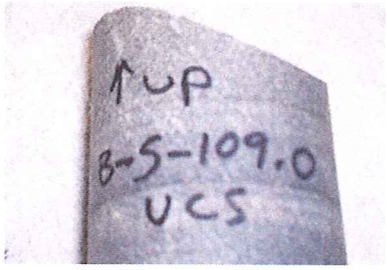
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

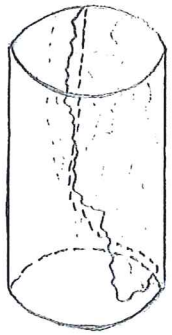
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-5-109.0	6893-1	11/04/2009	4.96	2.40	51910	4.52	11480	rad/shear

Remarks:

Images:







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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-5	Tested By:	GW
Sample ID/Depth	B-5-145.1	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

Sample Description:

COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-5-145.1	6893-14	11/09/2009	5.23	2.40	42890	4.52	9490	radial

Remarks:

Images:

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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-5	Tested By:	GW
Sample ID/Depth	B-5-310.7	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

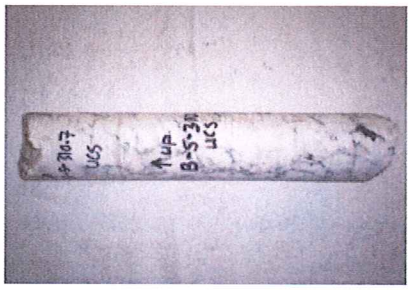
Sample Description: _____

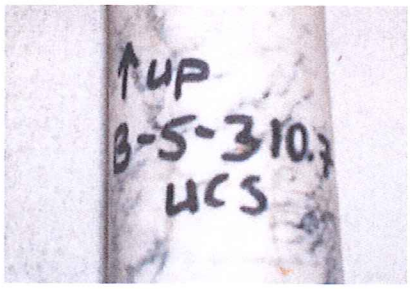
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

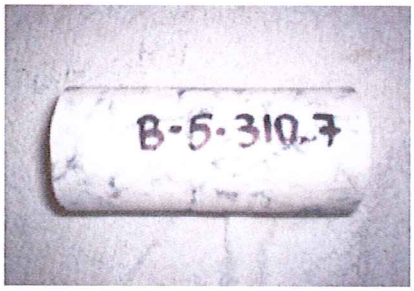
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-5-310.7	6893-16	11/09/2009	4.88	2.39	24170	4.49	5380	radial

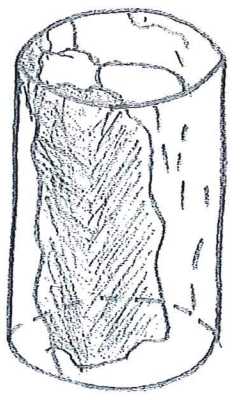
Remarks:

Images:









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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-5	Tested By:	GW
Sample ID/Depth	B-5-385.7	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐

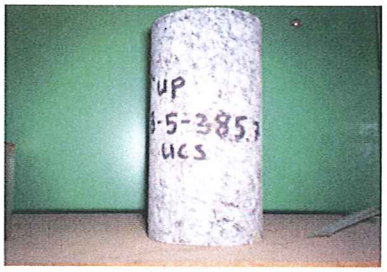
Sample Description:

COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-5-385.7	6893-0	11/03/2009	4.85	2.39	39370	4.49	8770	radial

Remarks:

Images:



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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-5	Tested By:	GW
Sample ID/Depth	B-5-410.7	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

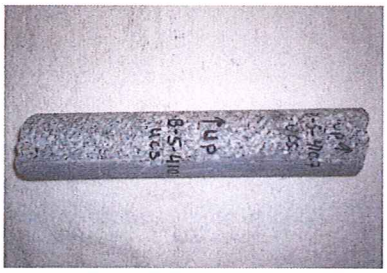
Sample Description: _____

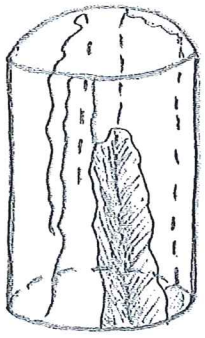
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-5-410.7	6893-19	11/09/2009	5.04	2.40	50650	4.52	11210	radial

Remarks: _____

Images:





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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

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Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-6	Tested By:	GW
Sample ID/Depth	B-6-149.3	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

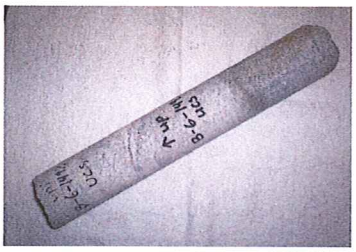
Sample Description: _____

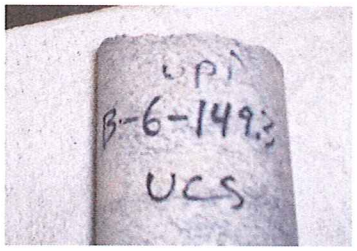
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

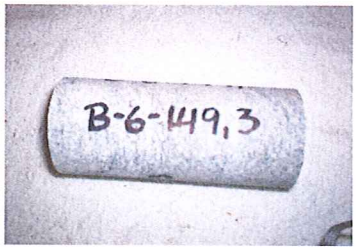
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-6-149.3	6893-21	11/10/2009	5.08	2.40	46790	4.52	10350	radial

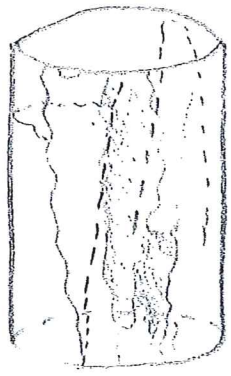
Remarks:

Images:









2757 152nd Avenue NE
Redmond, WA 98052
ph:425.869-6750
fx: 425.869-6761

UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-6	Tested By:	GW
Sample ID/Depth	B-6-239.9	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

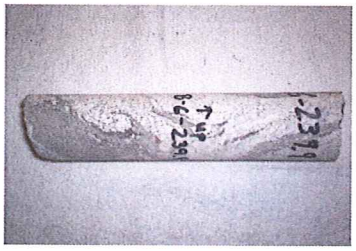
Sample Description: _____

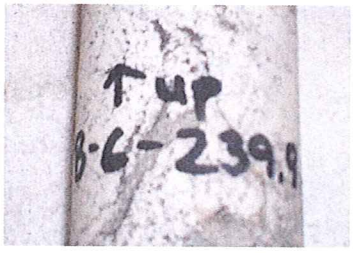
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

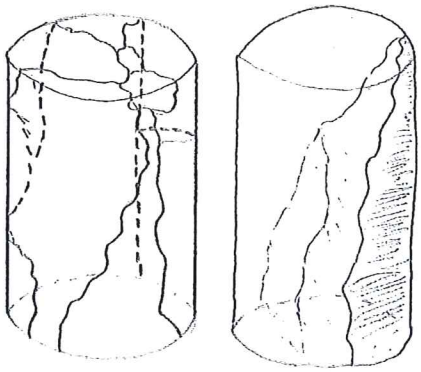
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-6-239.9	6893-2	11/04/2009	5.06	2.38	18110	4.45	4070	con/rad

Remarks: _____

Images:







2757 152nd Avenue NE
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UNCONFINED COMPRESSIVE STRENGTH DATA REPORT
ASTM D7012

hayremcelroy & associates, llc

Project:	ASPECT Gorge 2nd Tunnel	HMA Project No.:	08-175
Boring ID	B-6	Tested By:	GW
Sample ID/Depth	B-6-281.9	Reviewed By:	JAM

MATERIAL TESTED

Soil: ☐ Rock: ☑ Other (Identify): ☐ _____

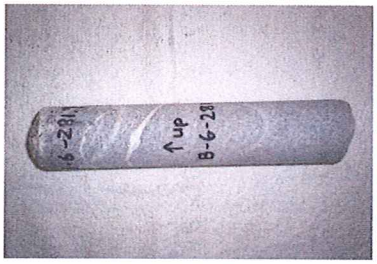
Sample Description: _____

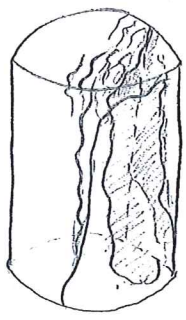
COMPRESSIVE STRENGTH TEST DATA (ASTM D7012, ASTM D2166)

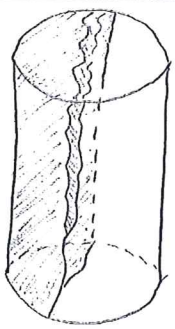
SAMPLE ID	LAB No.	DATE OF TEST	AVERAGE LENGTH	AVERAGE DIAMETER	MAXIMUM LOAD (lbs)	AVERAGE CROSS SECTION AREA (inch^2)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE *(Specify radial, conical, or other)*
B-6-281.9	6893-3	11/04/2009	5.02	2.38	34510	4.45	7760	radial

Remarks: _____

Images:







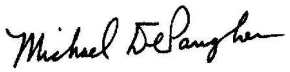
Petrographic Report #XRN

November 25, 2009

for

Annaliese Eipert
Aspect Consulting
401 2nd Ave. S, Suite 201
Seattle, WA 98104

by



Michael DePangher, Ph.D.
Spectrum Petrographics, Inc.

Key to Petrographic and Photomicrographic Descriptions

Clay minerals common in altered rocks must often be identified by X-ray diffraction either because their optic properties are not diagnostic or because they are too fine grained to be reliably identified by optical methods. The term "clay" is used herein to denote fine grained phyllosilicates in general. Under ideal conditions, it is often possible to optically discriminate between 4 major groups: kaolinite, smectite, mica (including illite), and chlorite. This is done whenever conditions permit.

The term "sericite" is applied to fine grained colorless phyllosilicates that show upper 2nd order maximum interference colors. These could include muscovite, illite, paragonite, lepidolite, margarite, clintonite, pyrophyllite, and talc. The term "intermediate clay" is applied to fine grained very pale or colorless phyllosilicates that show upper 1st order maximum interference colors. These are probably dominated by chlorite, smectite, and mixed-layer illite/smectite.

The term "opaques" is used to refer to all materials opaque (and sometimes semi-opaque) to transmitted light. The term "FEOH" is herein used to indicate fine grained, yellowish to reddish brown, earthy materials of varying opacity in transmitted light. FEOH is probably mostly Fe oxy-hydroxides but may sometimes include sphalerite, realgar, orpiment, jarosite, a number of Mn oxy-hydroxides, and organic matter.

A question mark after a rock or mineral name in a petrographic description means that there is uncertainty about the identification of that rock or mineral.

Particle size distributions are given as (A-B µm), where A and B are the median and largest particle sizes, respectively, in microns. A question mark (?) in the position of A or B indicates that the value of A or B was indeterminate, probably because of excessively large or small particle size or statistically insignificant numbers of particles.

Mineral abundances are visual estimates for an entire slide. For multi-lithologic materials (cuttings, etc...), mineralogy, textures, and alteration are described only for the dominant lithology.

Section preparation codes are as follows: (1) Format: 27 x 46 mm, 51 x 76 mm, or 1" round; (2) Finish: standard lapping (STD) or polished (POL); (3) Stains: sodium cobaltinitrite (SCN), alizarin red S (ARS), potassium ferricyanide (PF), and barium chloride + potassium rhodizonate (BCPR); and (4) Cover: none, or permanent Loctite acrylic (PLA).

Photomicrograph captions/labels contain the following items of information in consecutive order separated by forward slashes: (1) sample identification; (2) film roll number; (3) frame number; (4) illumination; (5) field of view (FOV); and (6) the job identification number. "PPL" indicates plane-polarized light; "XPL indicates cross-polarized light; "R" indicates reflected light. "550" means that a 550 nanometer wavelength plate was inserted in the light path. "C" indicates that the substage condenser was in (sometimes used for Fe-oxides). "O" indicates substage condenser in an oblique position. These various illuminations can be combined. "CON" indicates conoscopic illumination. POL means that a polarizing filter was used with the lens, and DAY means the sample was photographed in diffused daylight.

Features on photomicrographs are indicated by the number of the feature in the ALTERATION section of the text or by a mineral name abbreviation: **Q**uartz, **P**lagioclase, **K**-feldspar, **ser**icite, **b**io**t**ite, **fe**rroan **c**al**c**ite, **act**inolite.

For hypertext links to images to function properly, the images must reside in the same folder as the report.

Comments

B-2-133.4

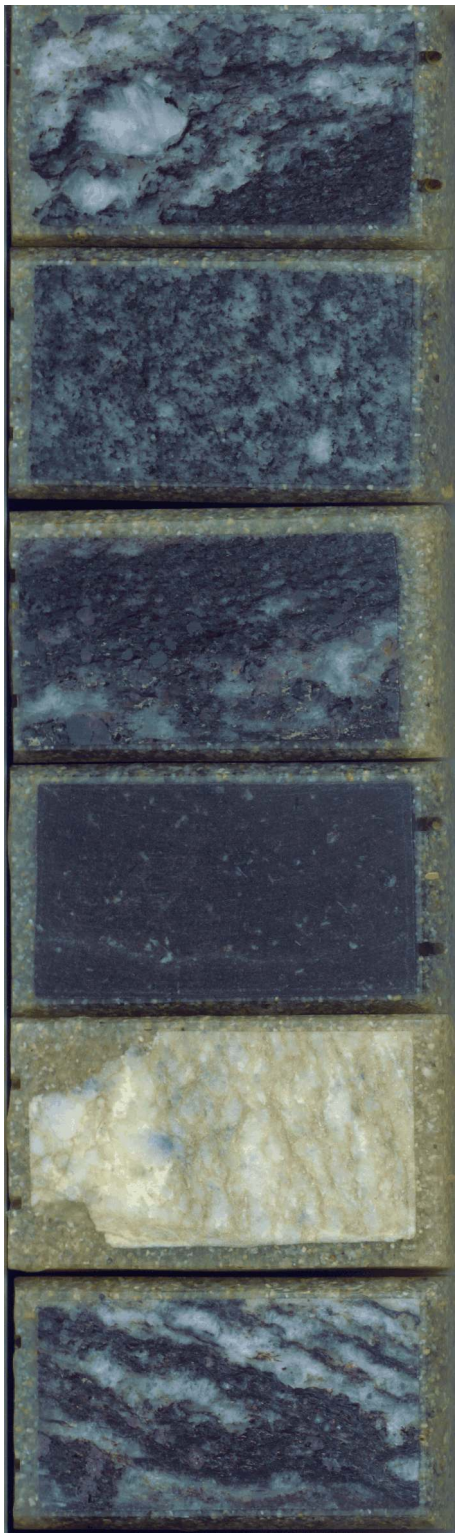
B-2-421.9

B-2-587.9

B-2-787.8

B-3-281.0

B-4-47.8



B-4-200.8

B-5-310.7

B-5-385.7

B-5-410.7

B-6-281.9

SAMPLE # **B-2-133.4** November 25, 2009

ROCK NAME BIOTITE-QUARTZ-PLAGIOCLASE SCHIST-- probably formed by regional dynamothermal metamorphism and cataclasis of a quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (50%) + quartz (32%) + biotite (15%) + clay (1%) + apatite (1%) + opaques (1%).

TEXTURES Phaneritic, holocrystalline, seriate, porphyroclastic.

Fabric: weakly directed (cataclasis)
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroclasts (70%) are dominated 1200-11,800 µm monocrystalline plagioclase + polycrystalline [plagioclase ± quartz].

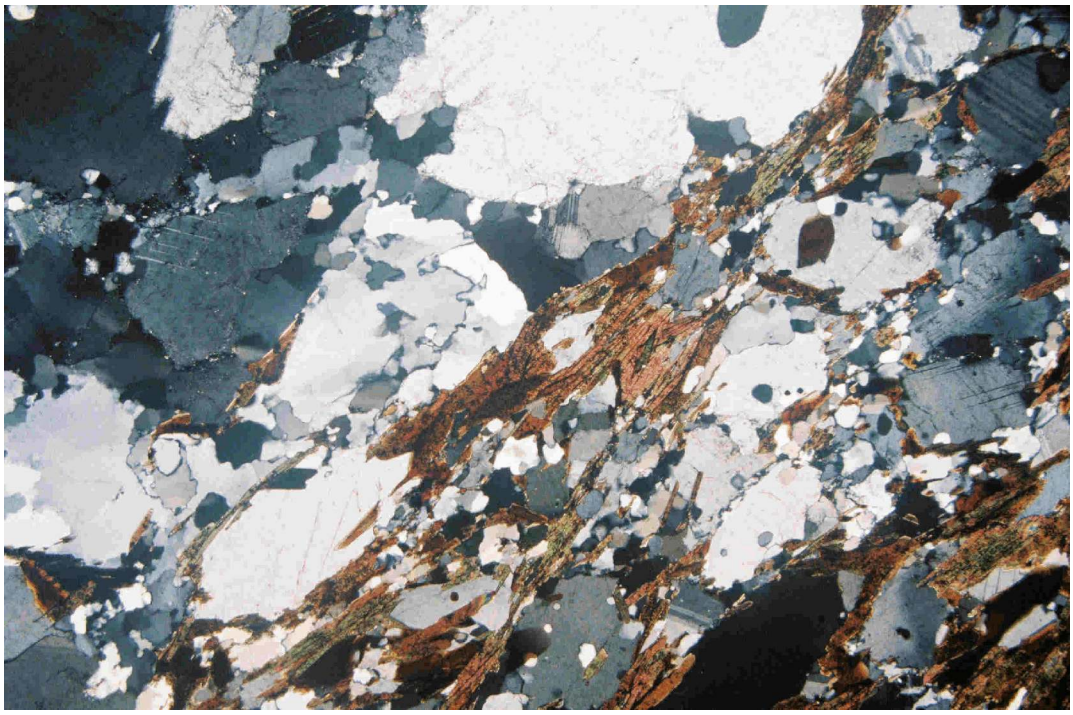
Matrix (30%) is dominated by granoblastic [biotite + quartz].

ALTERATION The following alteration features are also present but of indeterminate relative ages:(1) regional dynamothermal metamorphism and cataclasis; and (2) plagioclase weakly altered to clay.

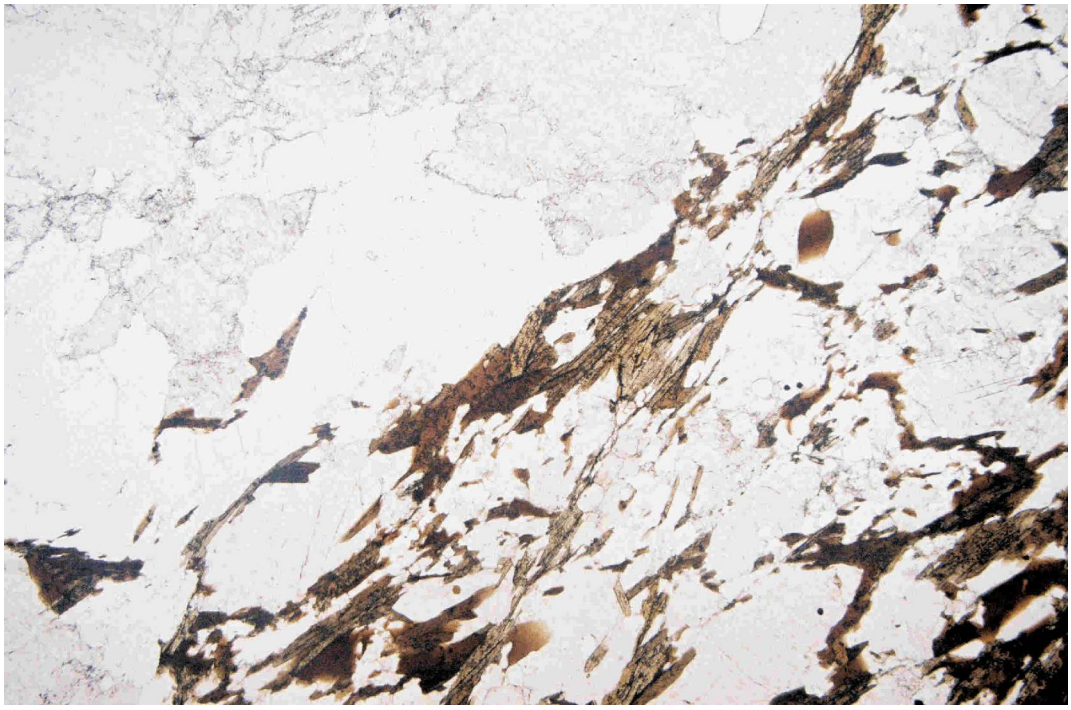
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-2-133.4 09034_09.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_10.jpg).



B-2-133.4 09034_10.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_09.jpg).



SAMPLE # **B-2-421.9** November 25, 2009

ROCK NAME BIOTITE-QUARTZ-PLAGIOCLASE SCHIST-- probably formed by regional dynamothermal metamorphism of a quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (40%) + quartz (27%) + biotite (15%) + actinolite (10%) + sphene (4%) + opaques (2%) + clay (1%) + apatite (1%) + chlorite (<1%) + leucoxene (<1%) + zircon (<1%).

TEXTURES Phaneritic, holocrystalline, equigranular.

Fabric: non-directed
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroblasts/clasts (0%) were not observed.

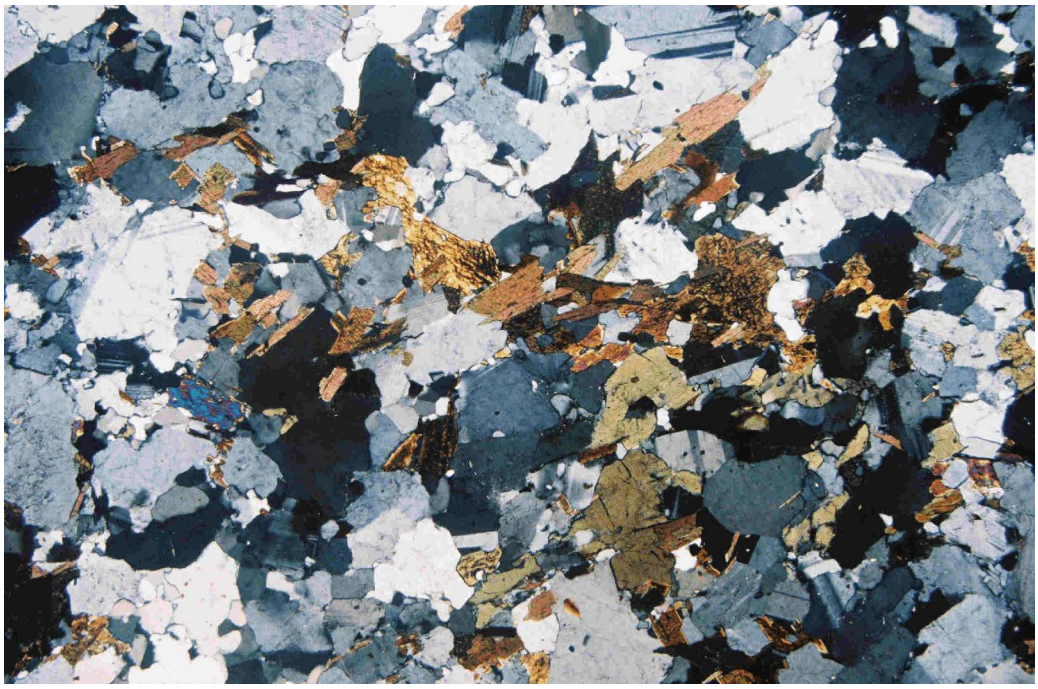
Matrix (100%) is dominated by 600-3000 µm granoblastic [plagioclase + quartz + biotite + actinolite + sphene].

ALTERATION The following alteration features are also present but of indeterminate relative ages:(1) regional dynamothermal metamorphism; (2) plagioclase weakly altered to clay; (3) biotite weakly altered to chlorite + leucoxene; and (4) opaques strongly altered to sphene.

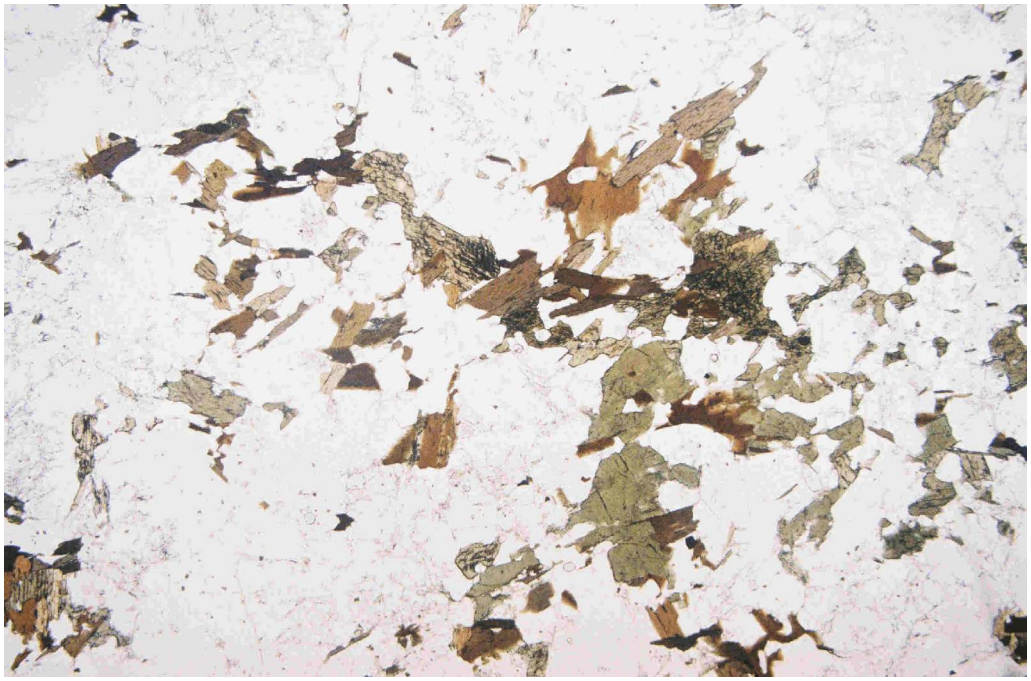
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-2-421.9 09034_11.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_12.jpg).



B-2-421.9 09034_12.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_11.jpg).



SAMPLE # **B-2-587.9** November 24, 2009

ROCK NAME BIOTITE-QUARTZ-GARNET-PLAGIOCLASE SCHIST-- probably formed by regional dynamothermal metamorphism of a quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (30%) + garnet (22%) + quartz (20%) + biotite (20%) + actinolite (5%) + opaques (2%) + apatite (1%) + chlorite (<1%) + carbonate (<1%) + zircon (<1%).

TEXTURES Phaneritic, holocrystalline, seriate .

Fabric: weakly directed (biotite orientation)
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroblasts/clasts (0%) were not observed.

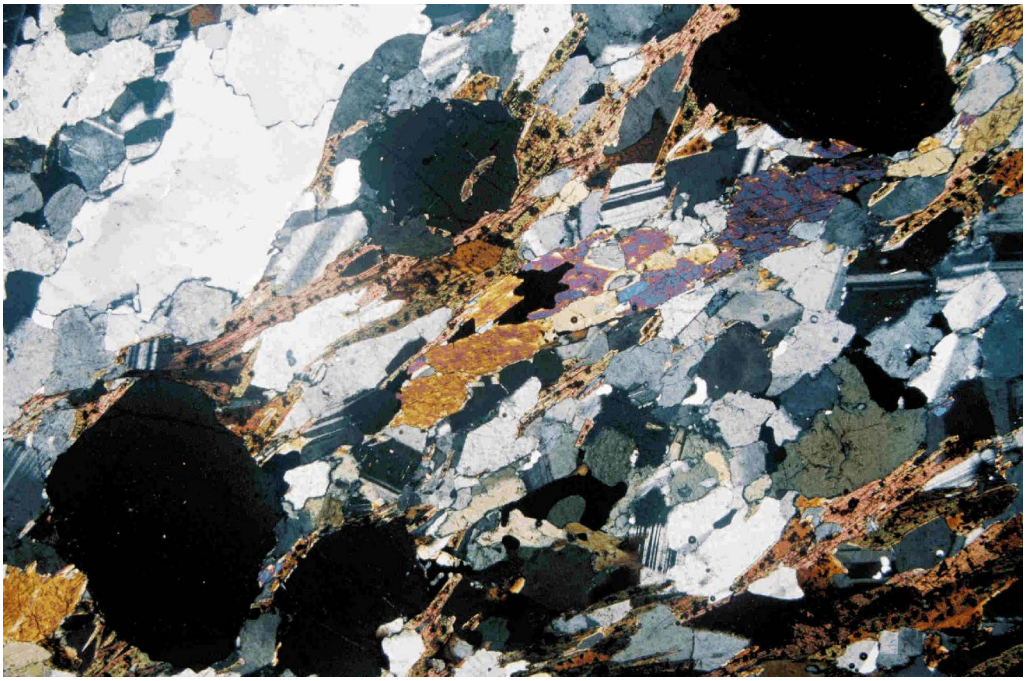
Matrix (100%) is dominated by 400-4800 µm granoblastic [plagioclase + garnet + quartz + biotite + actinolite].

ALTERATION The following alteration features are also present but of indeterminate relative ages:(1) regional dynamothermal metamorphism; and (2) garnet weakly altered to chlorite + carbonate.

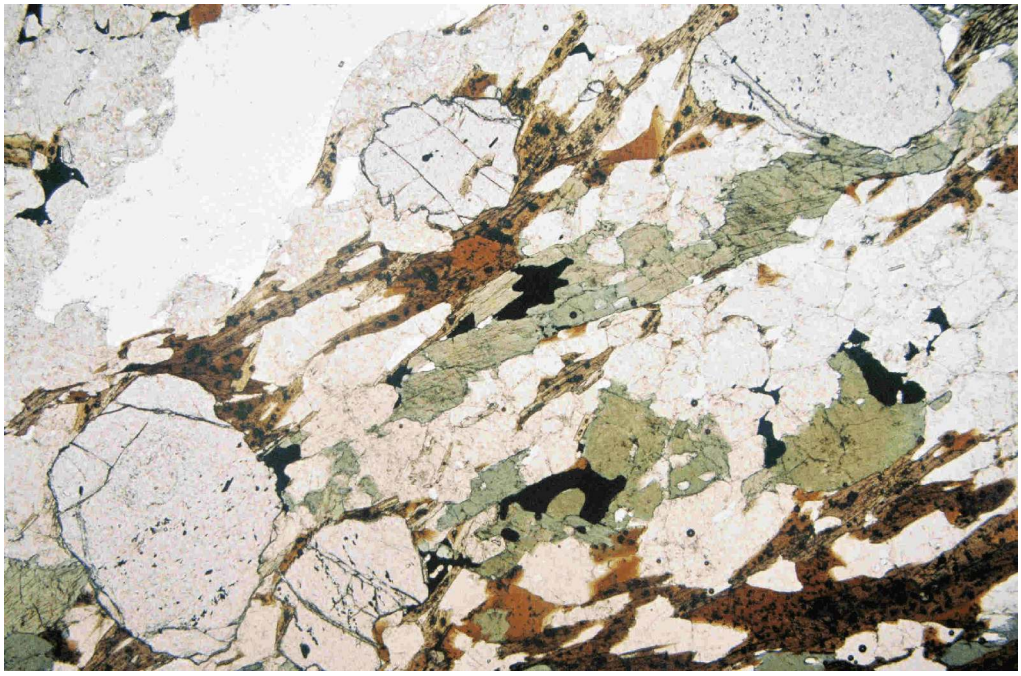
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-2-587.9 09034_13.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-GARNET-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_14.jpg).



B-2-587.9 09034_14.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-GARNET-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_13.jpg).



SAMPLE # **B-2-787.8** November 24, 2009

ROCK NAME ALTERED ANDESITE PORPHYRY -- probably formed by hydrothermal alteration (secondary biotite) from an andesite microporphyry porphyry flow or shallow intrusion.

MINERALS Plagioclase) (65%) + biotite (20%) + hornblende (10%) + quartz (2%) + opaques (2%) + sphene (1%).

TEXTURES Aphanitic, holocrystalline, microporphyritic, fine grained,

Fabric: non-directed
Grain Contacts: straight to sutured
Microfractures: absent

Phenocrysts (5%) subhedral to euhedral, whole, isolated 600-2000 µm.

Plagioclase (4%) are Albite twinned, zoned, and unaltered.

Hornblende (1%) are weakly altered to biotite.

Groundmass (95%) is composed of felsophyric plagioclase + [hornblende (?) completely altered to biotite] + [opaques moderately altered to sphene].

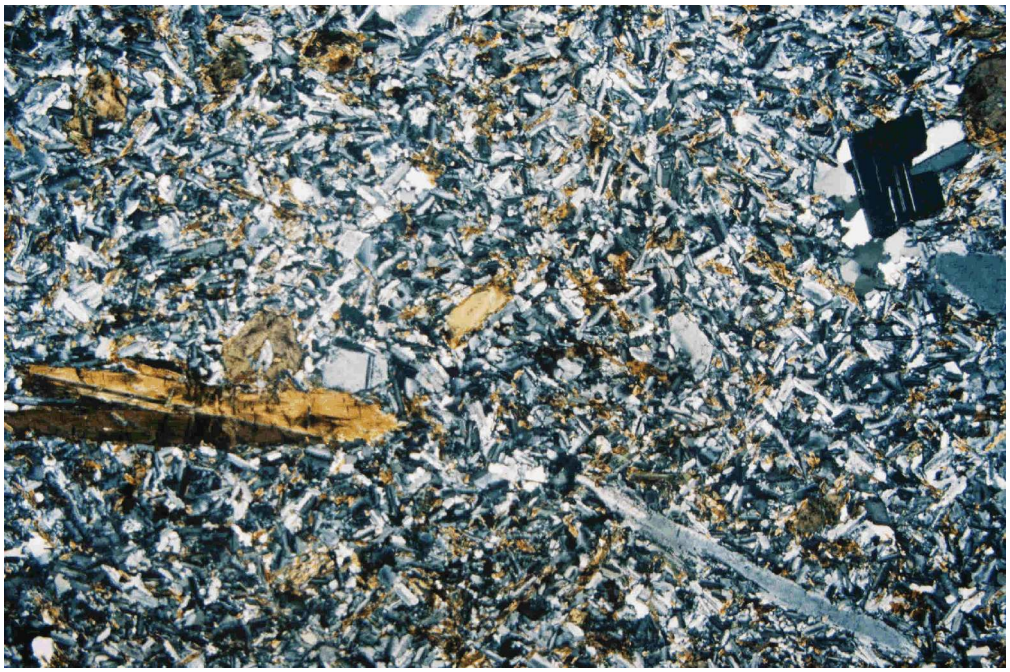
Vesicles (0%) and Xenoliths (0%) were not observed.

ALTERATION No other alteration features were observed.

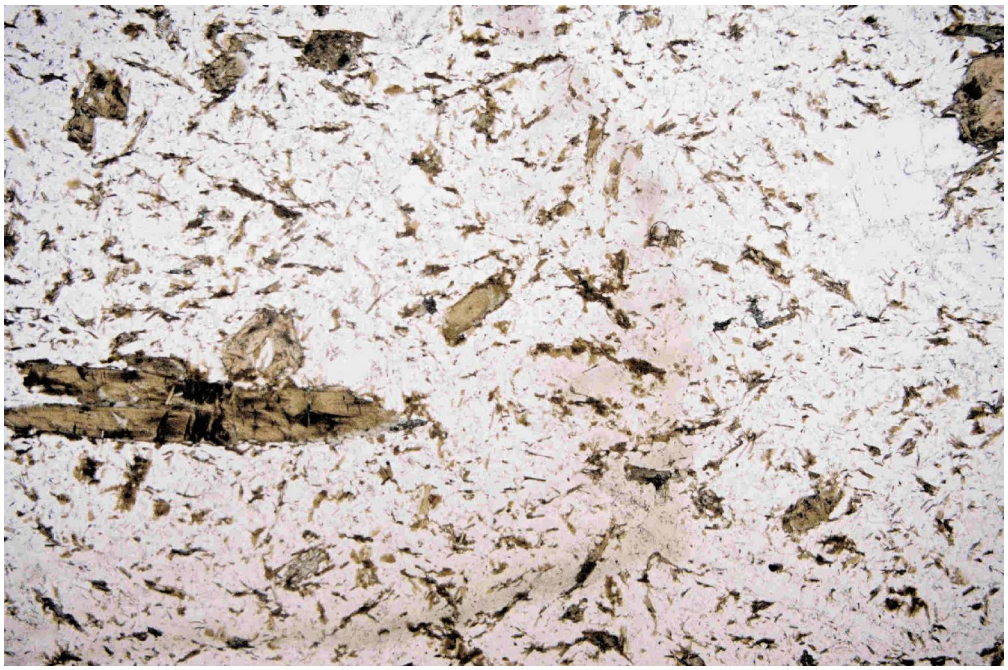
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-2-787.8 09034_15.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN ALTERED ANDESITE PORPHYRY showing typical appearance (same view as 09034_16.jpg).



B-2-787.8 09034_16.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN ALTERED ANDESITE PORPHYRY showing typical appearance (same view as 09034_15.jpg).



SAMPLE # **B-3-281.0** November 24, 2009

ROCK NAME ALTERED CATACLASITE -- probably formed by cataclasis and hydrothermal alteration (secondary quartz + sericite + dolomite + leucoxene) of a quartz diorite igneous or quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (50%) + quartz (15%) + sericite (15%) + dolomite (15%) + leucoxene (5%).

TEXTURES Phaneritic, holocrystalline, porphyroclastic.

Fabric: non-directed
Grain Contacts: indeterminate
Microfractures: absent

Porphyroclasts (ind.%) are lithic fragments of polycrystalline [plagioclase ± quartz].

Matrix (ind.%) is composed of the comminuted equivalent of the clasts, suggesting a dominantly cataclastic mechanism of brecciation.

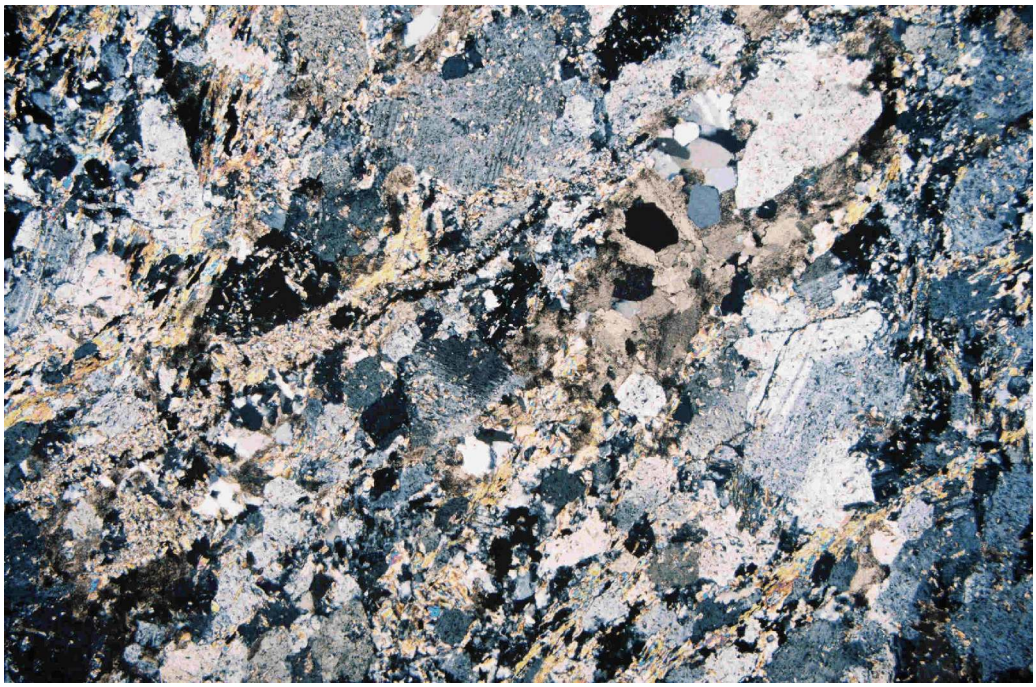
Cement (ind.%) is composed of dolomite + quartz + sericite.

ALTERATION Alteration features in relative chronological order from oldest to youngest are: (1) cataclasis; and (2) veins and cement composed of dolomite + quartz + sericite. The following alteration features are also present but of indeterminate relative ages: (1)plagioclase weakly altered to dolomite + sericite.

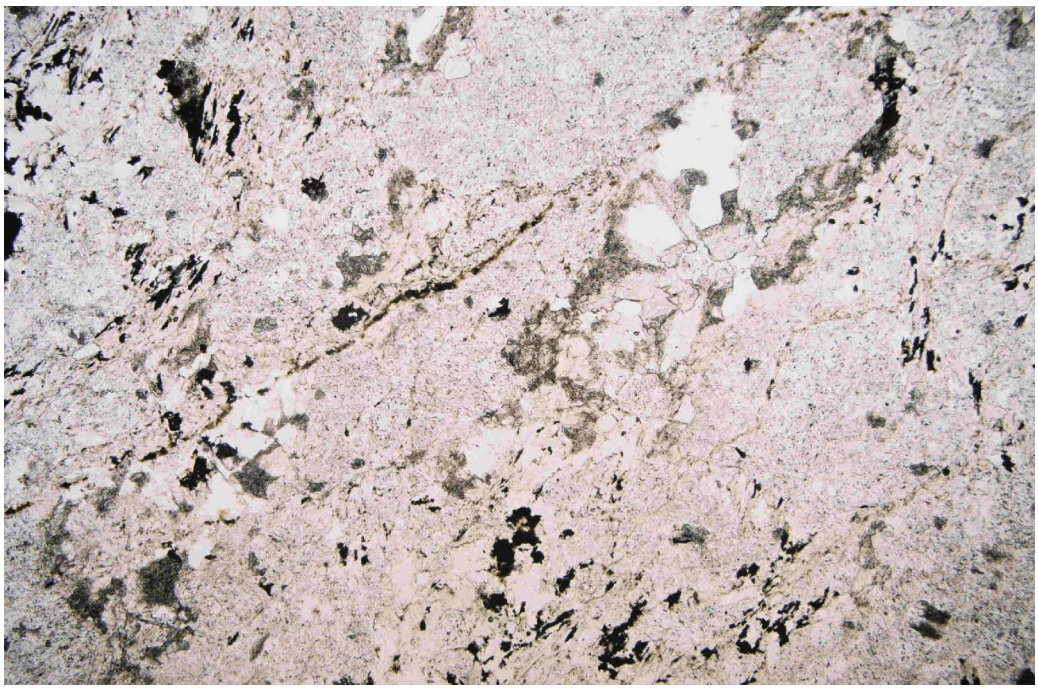
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-3-281.0 09034_17.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN ALTERED CATACLASITE showing typical appearance (same view as 09034_18.jpg).



B-3-281.0 09034_18.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN ALTERED CATACLASITE showing typical appearance (same view as 09034_17.jpg).



SAMPLE # **B-4-47.8** November 25, 2009

ROCK NAME BIOTITE-QUARTZ-PLAGIOCLASE SCHIST probably formed by regional dynamothermal metamorphism of a quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (39%) + quartz (39%) + biotite (13%) + garnet (5%) + chlorite (1%) + clay (1%) + dolomite (1%) + opaques (1%) + apatite (<1%) + zircon (<1%).

TEXTURES Phaneritic, holocrystalline, seriate.

Fabric: moderately directed (biotite orientation)
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroblasts/clasts (0%) were not observed.

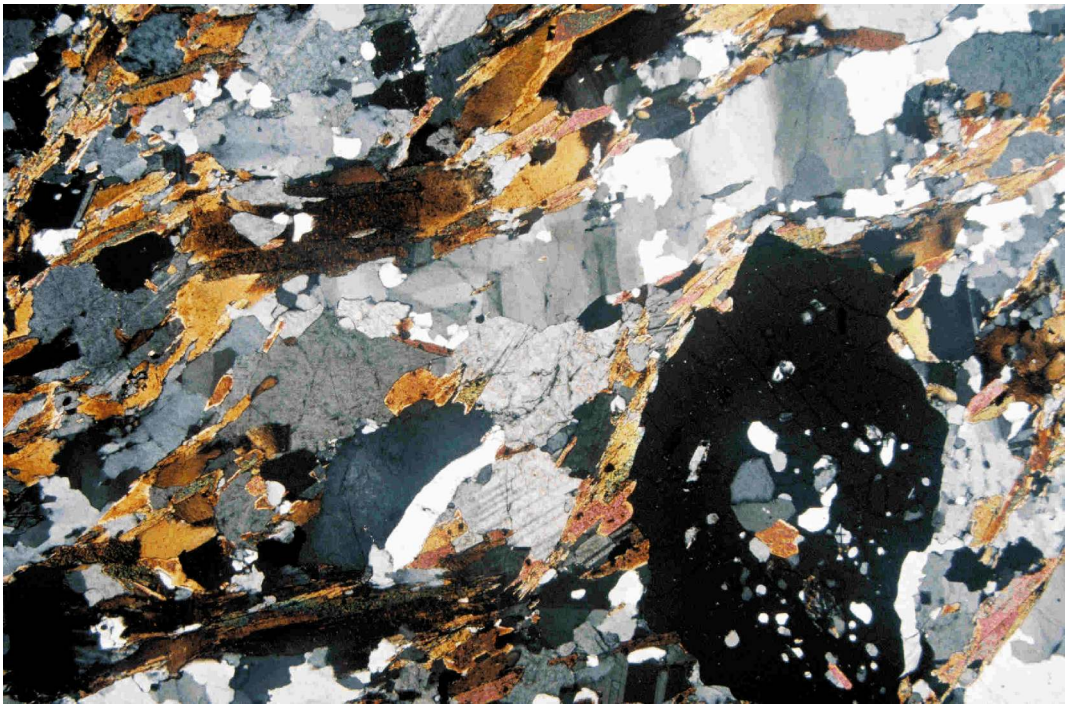
Matrix (100%) is dominated by 800-4000 µm seriate [plagioclase + quartz + biotite + garnet].

ALTERATION The following alteration features are also present but of indeterminate relative ages:(1) regional dynamothermal metamorphism; (2) plagioclase weakly altered to clay + dolomite; and (3) biotite weakly altered to chlorite.

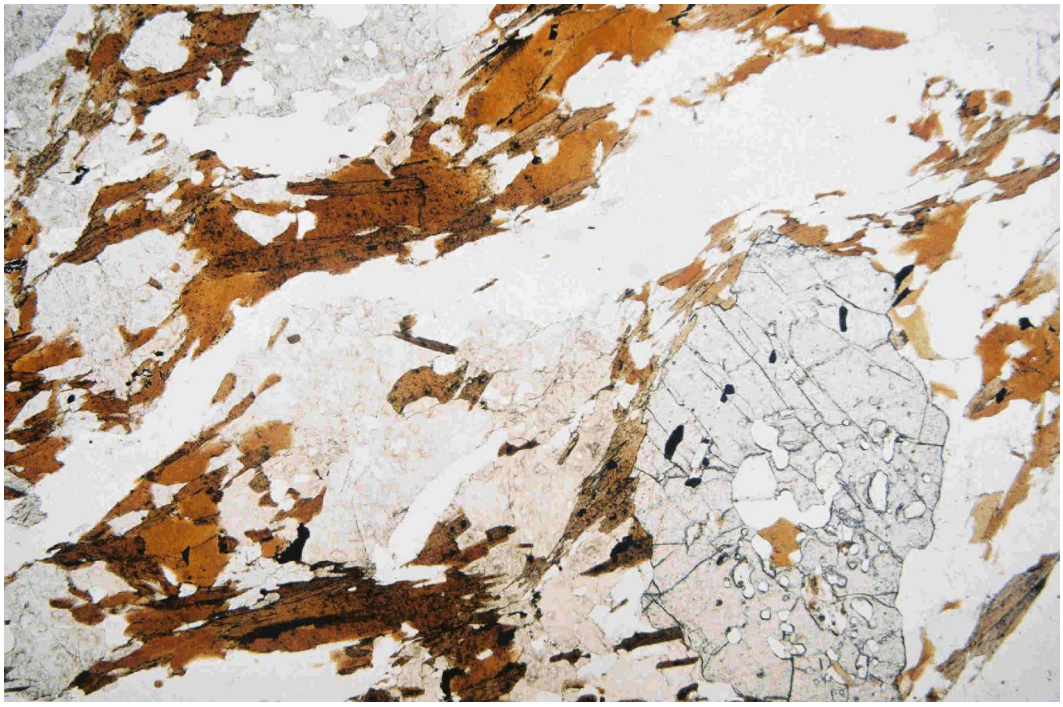
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-4-47.8 09034_19.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_20.jpg).



B-4-47.8 09034_20.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_19.jpg).



SAMPLE # **B-4-200.8** November 24, 2009

ROCK NAME GARNET-BIOTITE-ACTINOLITE-QUARTZ-PLAGIOCLASE SCHIST-- probably formed by regional dynamothermal metamorphism of a calcareous quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (40%) + quartz (21%) + actinolite (20%) + biotite (10%) + garnet (5%) + opaques (3%) + apatite (1%).

TEXTURES Phaneritic, holocrystalline, porphyroblastic.

Fabric: weakly directed (metamorphic foliation)
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroblasts (5%) are composed of 4400-8400 µm sieve-textured garnet.

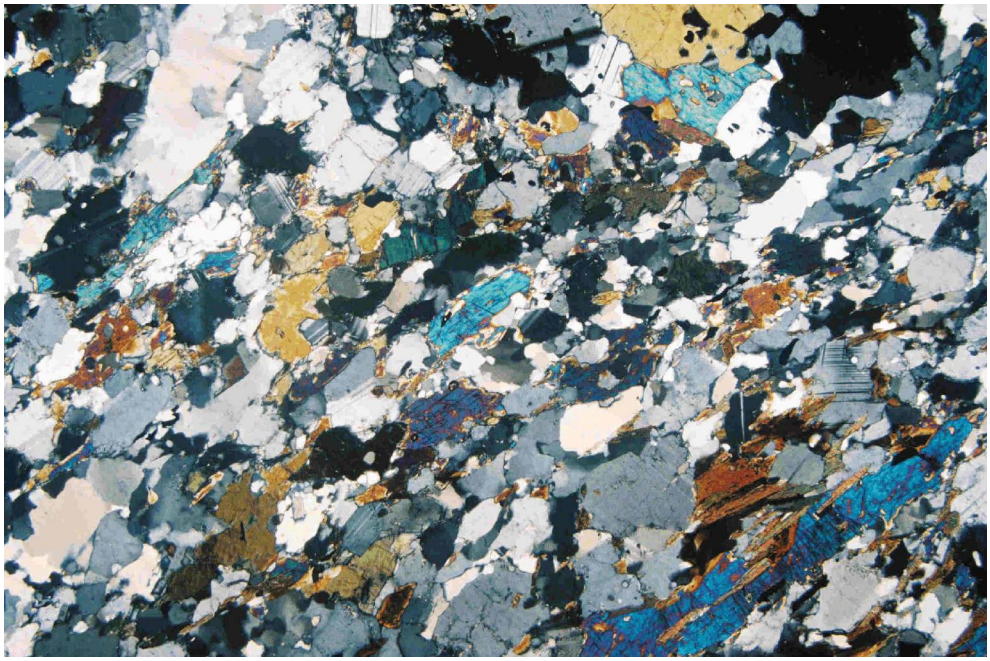
Matrix (95%) is dominated by 400 µm granoblastic [plagioclase + quartz + actinolite + biotite].

ALTERATION The following alteration features are also present but of indeterminate relative ages:(1) regional dynamothermal metamorphism.

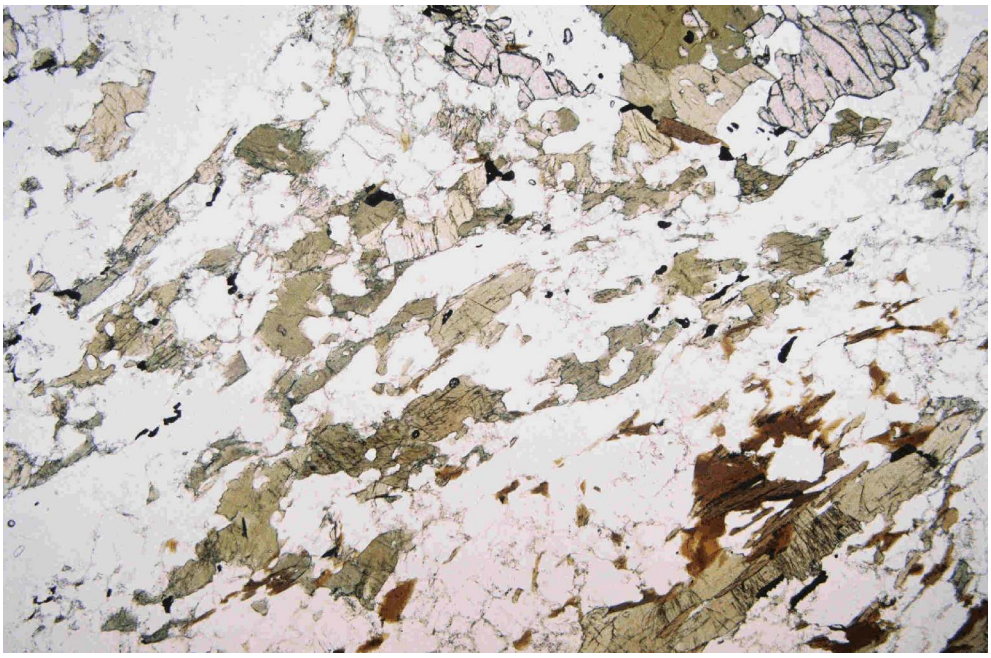
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-4-200.8 09034_21.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN GARNET-BIOTITE-ACTINOLITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_22.jpg).



B-4-200.8 09034_22.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN GARNET-BIOTITE-ACTINOLITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09034_21.jpg).



SAMPLE # **B-5-310.7** November 24, 2009

ROCK NAME CATACLASITE -- probably formed by cataclasis of a quartz diorite igneous or quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (50%) + quartz (41%) + biotite (8%) + apatite (1%) + chlorite (<1%) + clay (<1%).

TEXTURES Phaneritic, holocrystalline, porphyroclastic.

Fabric: weakly directed (cataclasis and biotite orientation)
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroclasts (72%) are composed of 4000-7200 µm monocrystalline plagioclase + lithic fragments of polycrystalline [plagioclase ± quartz].

Matrix (28%) is composed of granoblastic [quartz + biotite].

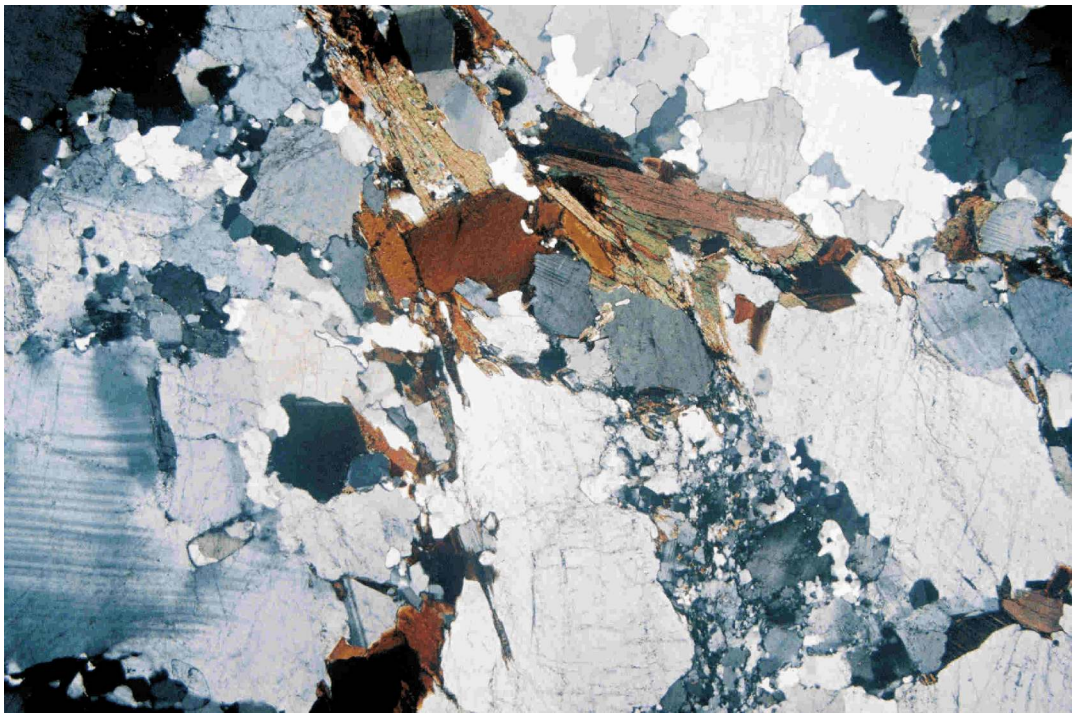
Cement (0%) was not observed.

ALTERATION The following alteration features are also present but of indeterminate relative ages: (1) cataclasis; (2) plagioclase weakly altered to clay; and (3) biotite weakly altered to chlorite.

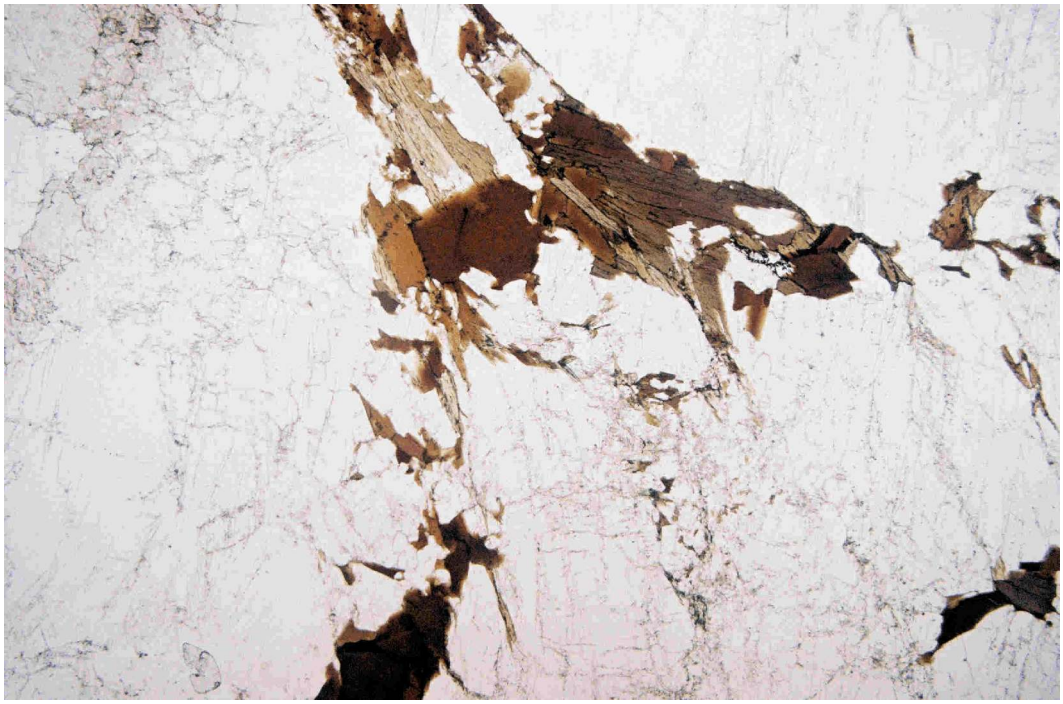
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-5-310.7 09034_23.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN CATACLASITE showing typical appearance (same view as 09034_24.jpg).



B-5-310.7 09034_24.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN CATACLASITE showing typical appearance (same view as 09034_23.jpg).



SAMPLE # **B-5-385.7** November 24, 2009

ROCK NAME GARNET-BIOTITE-ACTINOLITE-QUARTZ-PLAGIOCLASE SCHIST-- probably formed by regional dynamothermal metamorphism of a calcareous quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (45%) + quartz (29%) + biotite (18%) + actinolite (7%) + opaques (1%) + garnet (<1%) + apatite (<1%).

TEXTURES Phaneritic, holocrystalline, seriate.

Fabric: moderately directed (biotite orientation)
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroblasts (0%) were not observed.

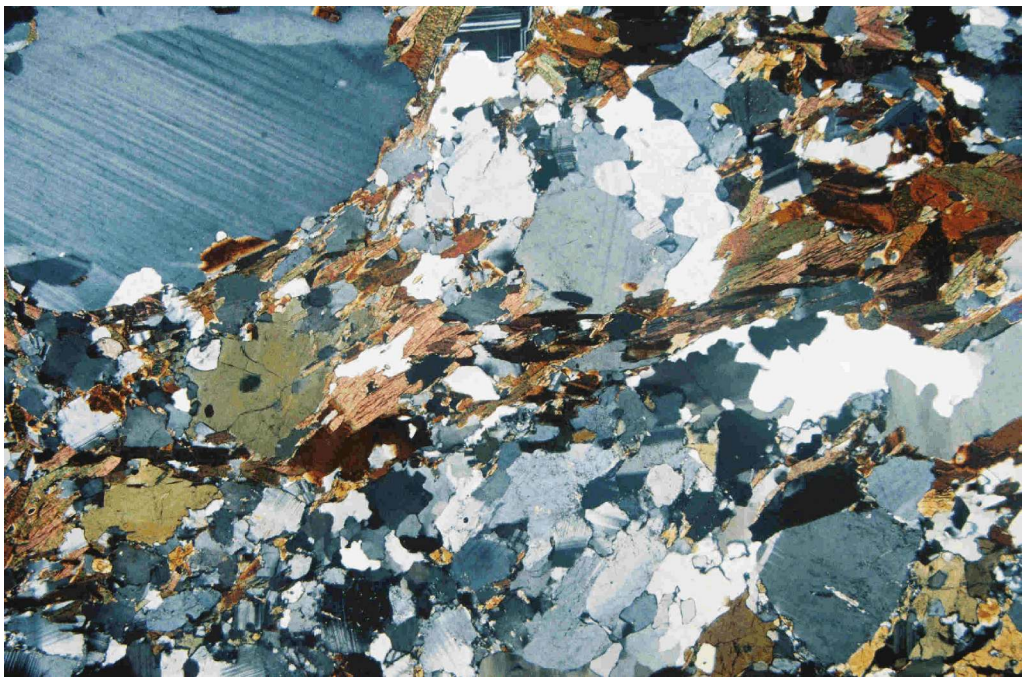
Matrix (100%) is dominated by 600-4600 µm seriate [plagioclase + quartz + biotite + actinolite].

ALTERATION The following alteration features are also present but of indeterminate relative ages:(1) regional dynamothermal metamorphism.

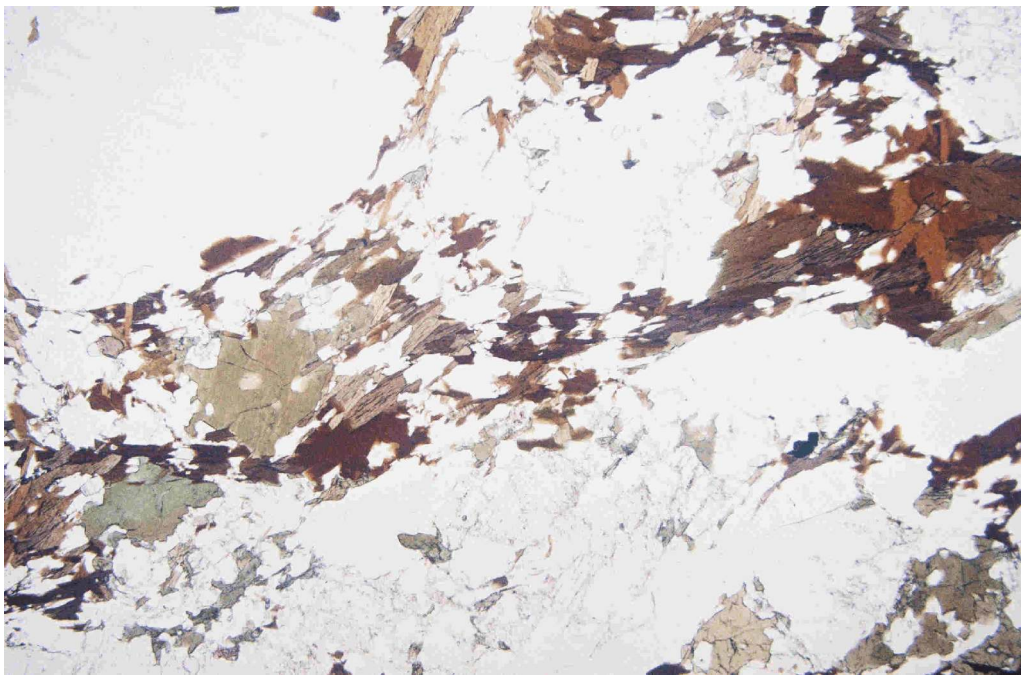
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-5-385.7 09035_00.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN GARNET-BIOTITE-ACTINOLITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09035_01.jpg).



B-5-385.7 09035_01.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN GARNET-BIOTITE-ACTINOLITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09035_00.jpg).



SAMPLE # **B-5-410.7** November 24, 2009

ROCK NAME BIOTITE-QUARTZ-PLAGIOCLASE SCHIST-- probably formed by regional dynamothermal metamorphism of a quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (48%) + quartz (25%) + biotite (25%) + clay (1%) + opaques (1%) + chlorite (<1%) + apatite (<1%) + carbonate (<1%).

TEXTURES Phaneritic, holocrystalline, equigranular

Fabric: moderately directed (biotite orientation)
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroblasts (0%) were not observed.

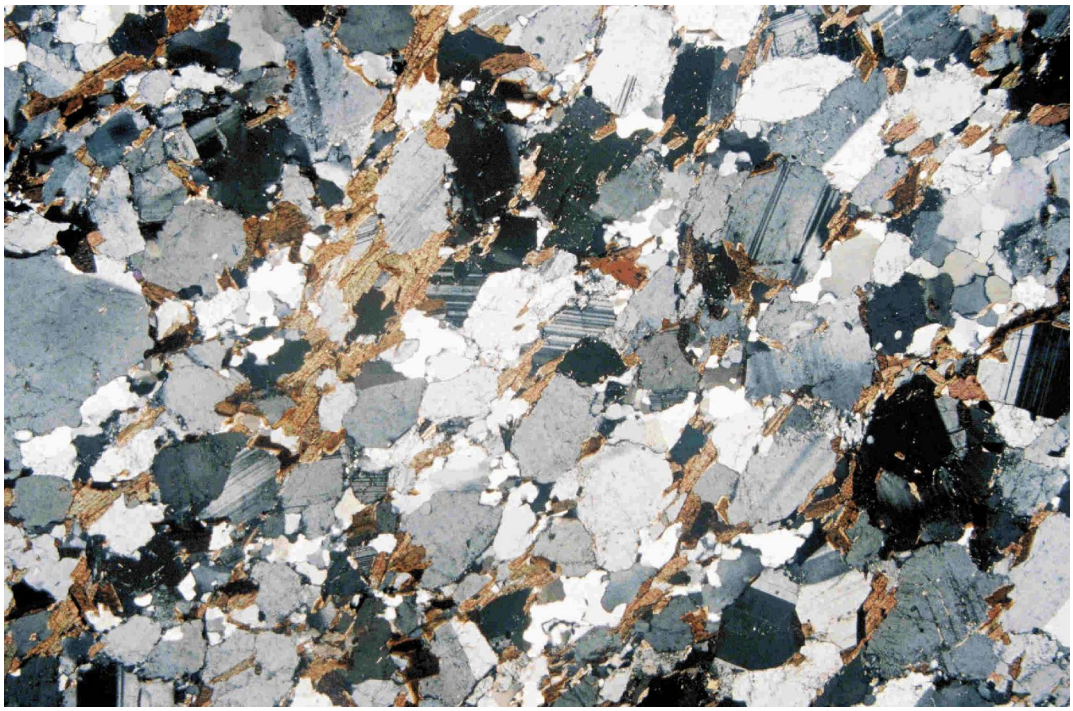
Matrix (100%) is dominated by 520-2400 µm granoblastic [plagioclase + quartz + biotite].

ALTERATION The following alteration features are also present but of indeterminate relative ages:(1) regional dynamothermal metamorphism; (2) plagioclase weakly altered to clay; and (3) biotite weakly altered to chlorite.

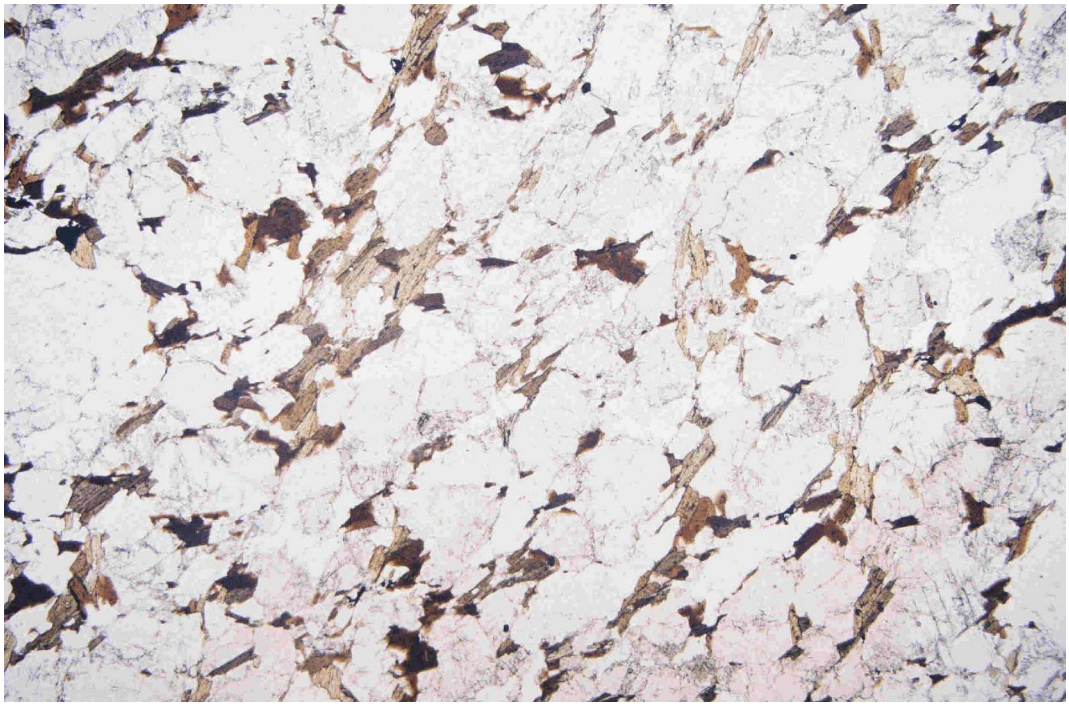
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-5-410.7 09035_02.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09035_03.jpg).



B-5-410.7 09035_03.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09035_02.jpg).



SAMPLE # **B-6-281.9** November 24, 2009

ROCK NAME BIOTITE-QUARTZ-PLAGIOCLASE SCHIST-- probably formed by regional dynamothermal metamorphism of a quartzofeldspathic sedimentary protolith.

MINERALS Plagioclase (55%) + quartz (28%) + biotite (15%) + apatite (2%) + opaques (<1%) + zircon (<1%).

TEXTURES Phaneritic, holocrystalline, equigranular

Fabric: weakly directed (biotite orientation)
Grain Contacts: straight to sutured
Microfractures: absent

Porphyroblasts (0%) were not observed.

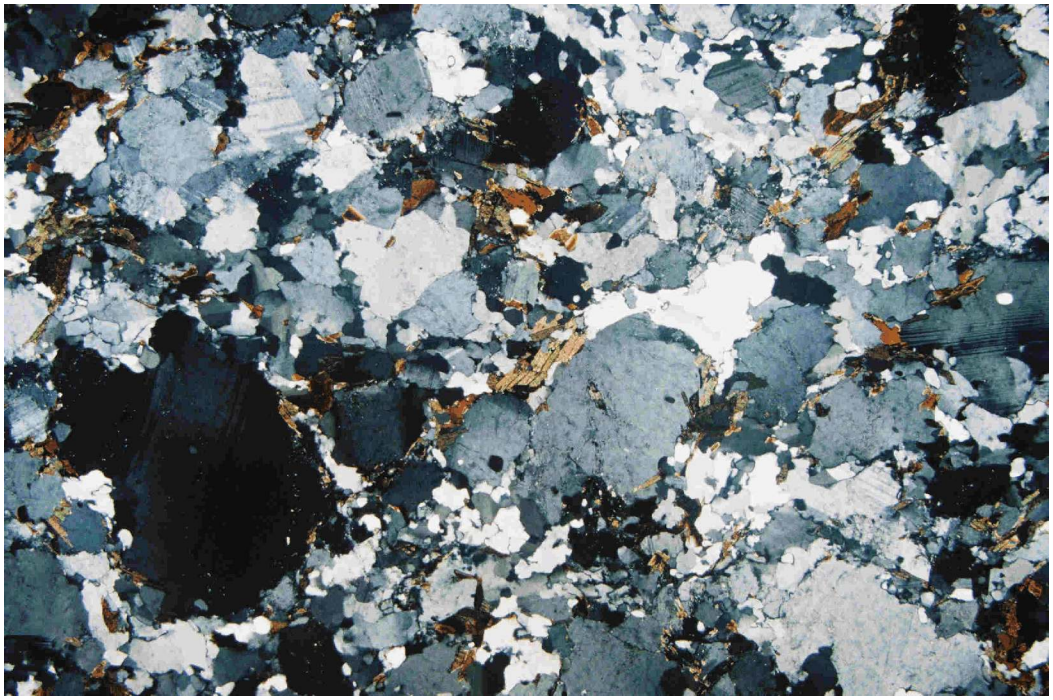
Matrix (100%) is dominated by 400-4600 µm granoblastic [plagioclase + quartz + biotite].

ALTERATION The following alteration features are also present but of indeterminate relative ages:(1) regional dynamothermal metamorphism.

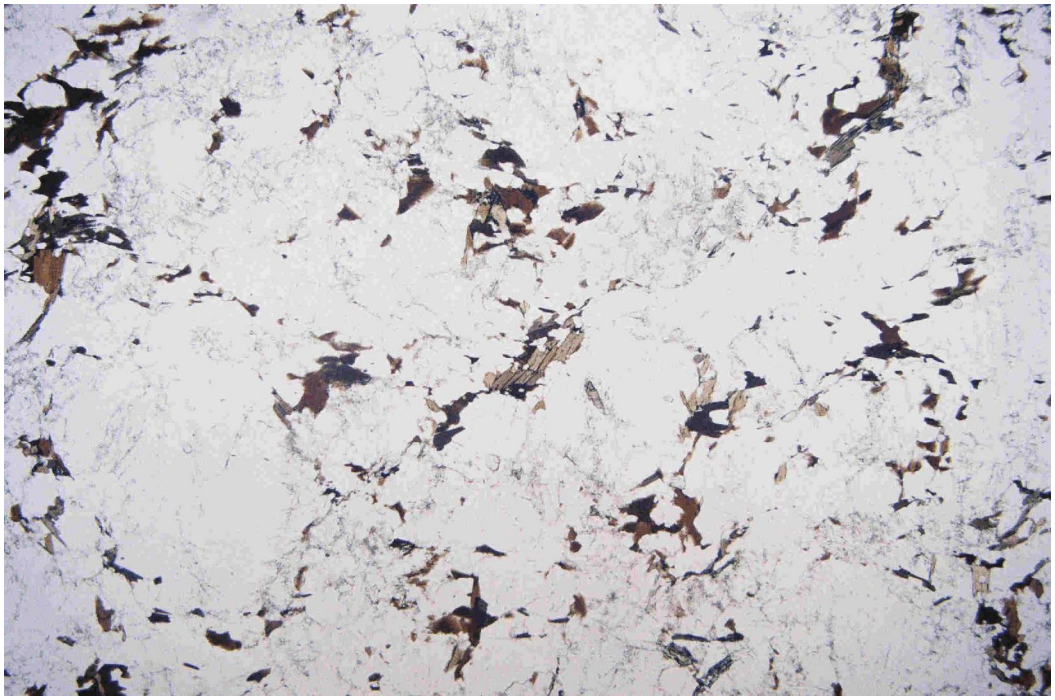
SECTIONING Format: 27 x 46 mm Finish: STD Stains: SCN (top ½) Cover: PLA

IMAGES

B-6-281.9 09035_04.jpg/XPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09035_05.jpg).



B-6-281.9 09035_05.jpg/PPL/FOV = 4.00 x 5.83 mm/XRN BIOTITE-QUARTZ-PLAGIOCLASE SCHIST showing typical appearance (same view as 09035_04.jpg).



Point Load Test Results

Borehole	Sample Depth	Rock Type[1]	Calculated Uniaxial Compressive Strength (psi) using standard C=24.5 value	Separately Measured Laboratory UCS value (psi)	Foliation angle/ strength of foliation	Platens relative to foliation (// or ⊥)	Break through obvious weakness[3] (Y/N/P (partially))?	Observations
B-1	51	GNEISS	**10461**	NT[5]	80/W	⊥	N	
B-1	51	GNEISS	**6353**	NT	80/W	//	P	
B-1	124	GNEISS	**9267**	NT	90/W	⊥	N	
B-1	124	GNEISS	**8309**	NT	90/W	//	N	
B-1	152	PEGMATITE	**6650**	NT	N/A	N/A	P	
B-1	182.1	PEGMATITE	**6650**	NT	N/A	N/A	N	
B-1	194	MIGMATITE	**6016**	NT	90/W	⊥	N	
B-1	243	MIGMATITE	**4519**	NT	30-90/M-var.	N/A	P	
B-1	244.8	GNEISS	**6832**	NT	85/M	⊥	N	
B-1	244.8	GNEISS	**8296**	NT	80/M	//	N	
B-1	252	GNEISS	**9915**	NT	85/M	⊥	N/A	Possibly slightly low value.
B-1	252	GNEISS	**10164**	NT	85/M	⊥	Y	
B-1	252	GNEISS	**11877**	NT	85/M	//	Y	
B-1	285.3[4]	GNEISS	**8471**	5000	45/VW	⊥	P	UCS test may be invalid. Point load: Break angle between parallel to core ends and foliation.
B-1	306.5	PEGMATITE	**6340**	NT	N/A	//	N	No foliation but with biotite veins.
B-1	324	GNEISS	**13064**	NT	60/VW	⊥	N	
B-1	324	GNEISS	**11695**	NT	60/VW	//	N	
B-2	22	MIGMATITE	**5261**	NT	0/S	//	Y	Through biotite crystal.
B-2	98	PEGMATITE	**9065**	NT	N/A	N/A	N	
B-2	109	GNEISS	**11075**	NT	45/VW	⊥	N	
B-2	109	GNEISS	**7824**	NT	45/VW	//	Y	
B-2	138	GNEISS	**7284**	16610	90/W	⊥	N	
B-2	142	GNEISS	**6785**	NT	30/VW	⊥?	N	Slipped; repositioned-possibly low value.
B-2	142	GNEISS	**7979**	NT	30/VW	//?	N	
B-2	168.3[4]	GNEISS	**8040**	9830	70/S	⊥	N	Quartz-rich, almost white.
B-2	211	GNEISS	**8485**	9830	90/VW	⊥	N	Foliation is very faint; may not be real.
B-2	211	GNEISS	**8235**	9830	90/VW	//	Y	Foliation is very faint; may not be real.
B-2	236.9[4]	MIGMATITE	**4458**	7910	5/S	//	Y	
B-2	282	GNEISS	**9416**	NT	30-80/W	⊥	P	Foliation at two angles? Hard to tell
B-2	282	GNEISS	**7817**	NT	30-80/W	//	P	Foliation at two angles? Hard to tell.
B-2	330	Quartz Vein	**9442**	NT	N/A	N/A	P	
B-2	336	GNEISS	**11000**	NT	90/W	⊥	N	
B-2	336	GNEISS	**11891**	NT	90/W	//	N	
B-2	342	MIGMATITE	**7217**	NT	40-90/M	⊥	N	
B-2	342	MIGMATITE	**9955**	NT	40-90/M	//	N	
B-2	402	GNEISS	**7689**	NT	40/W	⊥	P	
B-2	402	GNEISS	**7149**	NT	40/W	//	N	
B-2	421[4]	GNEISS	**7567**	11750	60/VW	⊥	P	Break angle between parallel to core ends and foliation.

Point Load Test Results

Borehole	Sample Depth	Rock Type[1]	Calculated Uniaxial Compressive Strength (psi) using standard C=24.5 value	Separately Measured Laboratory UCS value (psi)	Foliation angle/ strength of foliation	Platens relative to foliation (// or ⊥)	Break through obvious weakness[3] (Y/N/P (partially))?	Observations
B-2	491	MIGMATITE	**7419**	NT	45?/VW	⊥	N	
B-2	491	MIGMATITE	**9152**	NT	45?/VW	//	P	
B-2	522	GNEISS	**9173**	NT	40/W	⊥	N	
B-2	522	GNEISS	**9577**	NT	40/W	//	Y	
B-2	610	GNEISS	**5531**	NT	0/W-M	//	Y	
B-2	610	GNEISS	**5976**	NT	0/W-M	//	Y	
B-2	610	GNEISS	**5328**	NT	0/W-M	//	Y	
B-2	742	GNEISS	**13354**	NT	None	N/A	N	
B-2	796	ANDESITE	**5989**	NT	None	N/A	Y	
B-2	796	ANDESITE	**17394**	NT	None	N/A	P	
B-2	796	ANDESITE	**2361**	NT	None	N/A	Y	
B-2	796	ANDESITE	**10373**	NT	None	N/A	P	
B-3	36	GNEISS	**13422**	NT	10/W	⊥	N	
B-3	36	GNEISS	**12140**	NT	10/W	//	P	
B-3	93	GNEISS	**4654**	13800	90/M	⊥	N	
B-3	93[4]	GNEISS	**7588**	13800	90/M	⊥	N	
B-3	145	MIGMATITE	**7284**	NT	70/W-M	⊥	N	Mostly dark.
B-3	145	MIGMATITE	**5665**	NT	70/W-M	//	N	Mostly dark.
B-3	226	MIGMATITE	**12140**	NT	80/M-S	⊥	N	Mostly dark.
B-3	226	MIGMATITE	**8114**	NT	80/M-S	//	Y[2]	Mostly dark; [2] Broke partially along healed joint.
B-3	290	GNEISS	**13071**	NT	None	N/A	Y	Very light with small biotite; partially through healed joint.
B-3	290	GNEISS	**7487**	NT	None	N/A	Y	Very light with small biotite; thru healed joint (invalid).
B-3	295[4]	GNEISS	**11668**	12330	35/VW	⊥	N	
B-3	296.9[4]	GNEISS	**7331**	12330	40/W	⊥	N	
B-3	386	GNEISS	**6947**	NT	60/W	⊥	N	
B-3	386	GNEISS	**9530**	NT	60/W	//	N	
B-4	38	GNEISS	**6812**	NT	35/M	⊥	N	No quartz veins.
B-4	38	GNEISS	**7284**	NT	35/M	//	N	With quartz veins.
B-4	56	GNEISS	**10589**	NT	80/W-M	⊥	N	
B-4	56	GNEISS	**10974**	NT	80/W-M	//	N	
B-4	119	MIGMATITE	**6846**	NT	25/W	⊥	P	
B-4	119	MIGMATITE	**6144**	NT	25/W	//	N	
B-4	192	GNEISS	**9442**	NT	45/W	⊥	N	
B-4	192	GNEISS	**9105**	NT	45/W	//	Y	
B-4	200.8[4]	GNEISS	**8701**	7900	80/M	⊥	N	Chip off tip from first attempt (gauge not working).
B-4	200.8[4]	GNEISS	**2900**	7900	80/M	//	Y	Reset partway through (gauge not working), low value.
B-4	215[4]	GNEISS	**6023**	16160	5/S	⊥[2]	Y	[2] Foliation angle only 5 degrees.
B-4	215[4]	GNEISS	**5665**	16160	5/S	//	Y	
B-4	245	GNEISS	**8148**	NT	20/W	⊥	N	
B-4	245	GNEISS	**10555**	NT	20/W	//	N	
B-4	252	PEGMATITE	**5396**	NT	N/A	N/A	Y	
B-4	305	PEGMATITE	**9969**	NT	N/A	N/A	N	
B-4	337	PEGMATITE	**11257**	NT	N/A	N/A	N	

Point Load Test Results

Borehole	Sample Depth	Rock Type[1]	Calculated Uniaxial Compressive Strength (psi) using standard C=24.5 value	Separately Measured Laboratory UCS value (psi)	Foliation angle/ strength of foliation	Platens relative to foliation (// or ⊥)	Break through obvious weakness[3] (Y/N/P (partially))?	Observations
B-4	391.4	GNEISS	**11641**	9080	80/VW	⊥	N	
B-5	109	GNEISS	**10859**	NT	80/VW	//?	P	
B-5	109	GNEISS	**11412**	NT	80/VW	//?	P	
B-5	145.1	GNEISS	**14420**	9490	90/W	⊥	N	Quartz-rich.
B-5	171	GNEISS	**7338**	NT	80/W	⊥	N	
B-5	171	GNEISS	**7136**	NT	80/W	//	P	
B-5	205	PEGMATITE	**9699**	NT	None	//	N	
B-5	208	GNEISS	**10603**	NT	90?/W	⊥	N	
B-5	208	GNEISS	**11419**	NT	90?/W	//	P	
B-5	306	ANDESITE	**11466**	NT	None	N/A	N	Chipped; sample reset.
B-5	310.7	PEGMATITE	**2152**	5380	N/A	N/A	P[2]	[2] Broke through plagioclase crystal.
B-5	314	PEGMATITE	**10117**	NT	None	N/A	N	Point load value approximate.
B-5	314	PEGMATITE	**10097**	NT	None	N/A	N	
B-5	369	MIGMATITE	**2293**	NT	None	N/A	Y	Broke along healed joint.
B-5	369	MIGMATITE	**12295**	NT	None	N/A	N	
B-5	385.7[4]	GNEISS	**6151**	8770	50/M	⊥	N	Possibly invalid break.
B-5	405	GNEISS	**12005**	NT	None	N/A[2]	N	[2] Perpendicular to contact.
B-5	408	GNEISS	**10549**	NT	None	N/A	N	
B-5	410.7	GNEISS	**9105**	11210	90/VW	//	N?	Faint foliation; may have been misinterpreted.
B-5	410.7[4]	GNEISS	**9874**	11210	90/VW	⊥	N?	Faint foliation; may have been misinterpreted.
B-6	40[4]	ANDESITE	**10144**	NT	None	N/A	N	
B-6	132	GNEISS	**12066**	NT	30/W	⊥	Y	
B-6	132	GNEISS	**9598**	NT	30/W	//	Y	Partially along healed joint.
B-6	190	GNEISS	**7655**	NT	?/VW	⊥	N	
B-6	190	GNEISS	**8761**	NT	?/VW	//	N	
B-6	239[4]	MIGMATITE	**2718**	4070	85/S	⊥	P	
B-6	242	MIGMATITE	**8889**	NT	20/M(var.)	⊥	Y	
B-6	251	GNEISS	**9355**	NT	15/VW	⊥	N	
B-6	251	GNEISS	**10407**	NT	15/VW	//	P	

NOTES: Shaded values represent possibly invalid data, and were not included in histogram in Figure 11.

[1] GNEISS= Biotite Quartz Plagioclase Gneiss, MIGMATITE= Migmatitic Biotite Quartz Plagioclase Gneiss.

[2] See individual notes in Observations column.

[3] Breaks through weaknesses may result in inaccurate point load test results.

[4] Sample length less than sample diameter (non-ASTM standard method).

[5] NT = Not tested.

Foliation strength abbreviations: VW = very weak, W = weak, M = Moderate, S= Strong, var = Variable, N/A = Not applicable.

// = Maximum stress parallel to foliation.

⊥ = Maximum stress perpendicular to foliation.