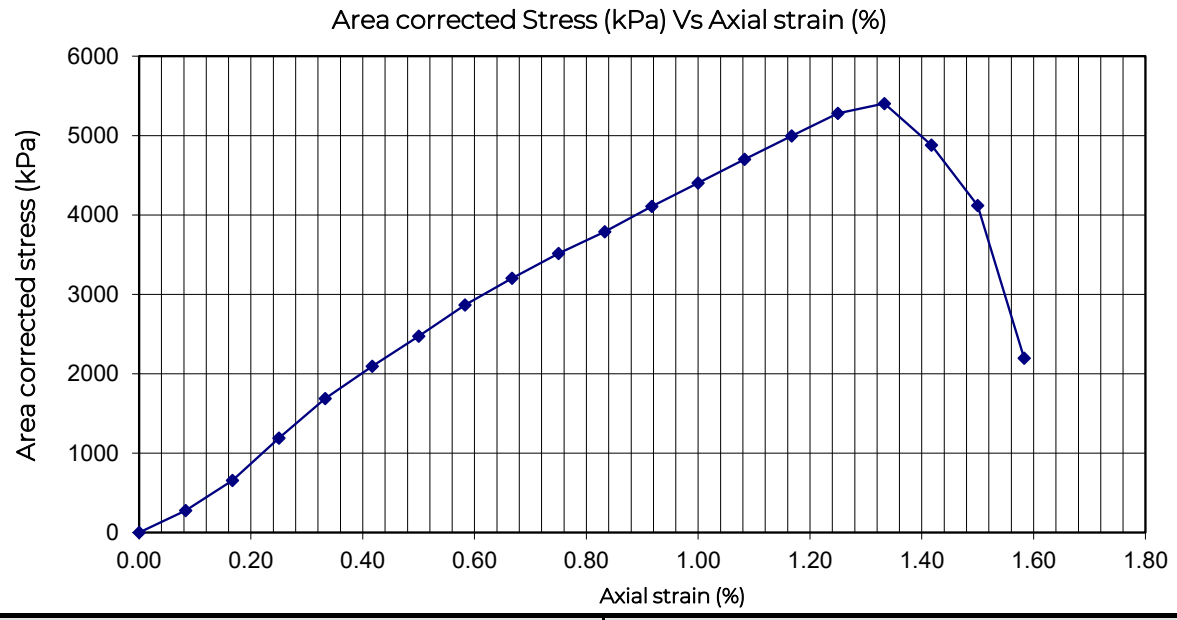
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Alternative to Brynderwyn Hills Section
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	25/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1104
Sample depth (m):	31.70-32.00
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 4-UCS
Client ref number:	1-C2466.16

Test results

Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.35	Water content as received (%)	11.2
Water content at compaction (%)	-	Initial sample diameter (mm)	60.1
Water content at testing (%)	11.2	Initial sample length (mm)	120.0
Dry density (t/m³)	2.10	Initial sample area (mm²)	2835.9
UCS Max stress (kPa)	5400	Initial Length:Diameter ratio	2:1
Strain at failure (%)	1.3	* Young's modulus (MPa)	506
Mode of failure:	Shear Along Side Plane	for strain range	0.00 - 0.33%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 24/11/25
Date reported 23/12/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 23/12/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Alternative to Brynderwyn Hills Section
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	25/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1104
Sample depth (m):	31.70-32.00
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 4-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 24/11/25

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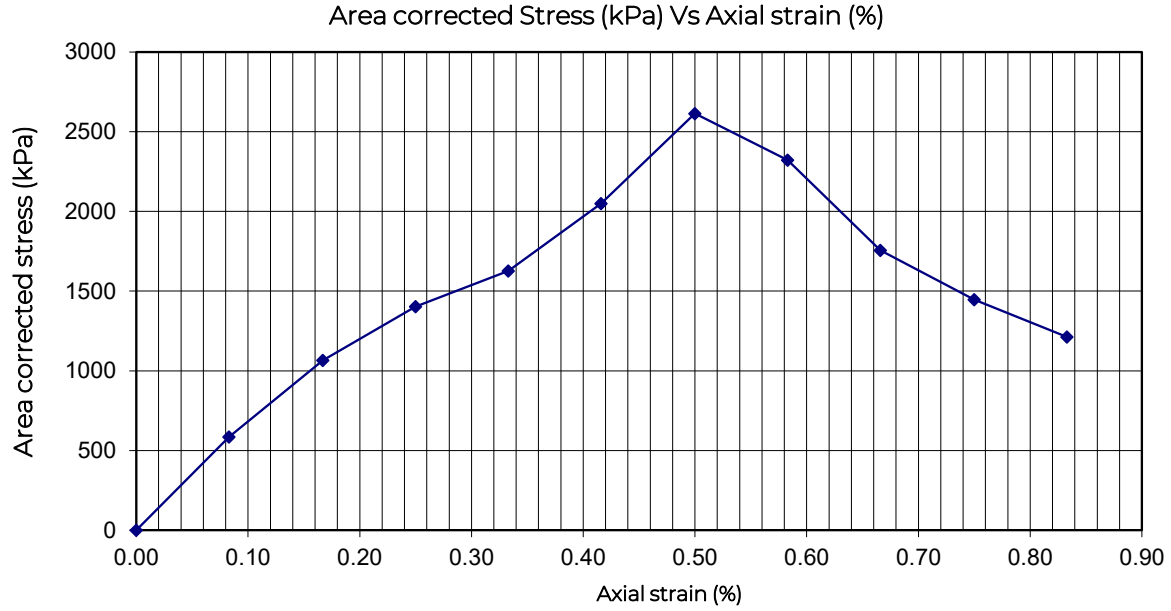
Website www.wsp.com/nz

UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	27/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very weak SANDSTONE
Sample reference:	BH2B_1104
Sample depth (m):	39.78-42.00
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 23-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.35	Water content as received (%)	10.9
Water content at compaction (%)	-	Initial sample diameter (mm)	60.1
Water content at testing (%)	10.9	Initial sample length (mm)	120.1
Dry density (t/m³)	2.10	Initial sample area (mm²)	2835.9
UCS Max stress (kPa)	2600	Initial Length:Diameter ratio	2:1
Strain at failure (%)	0.5	* Young's modulus (MPa)	639
Mode of failure:	Shear	for strain range	0.00 - 0.17%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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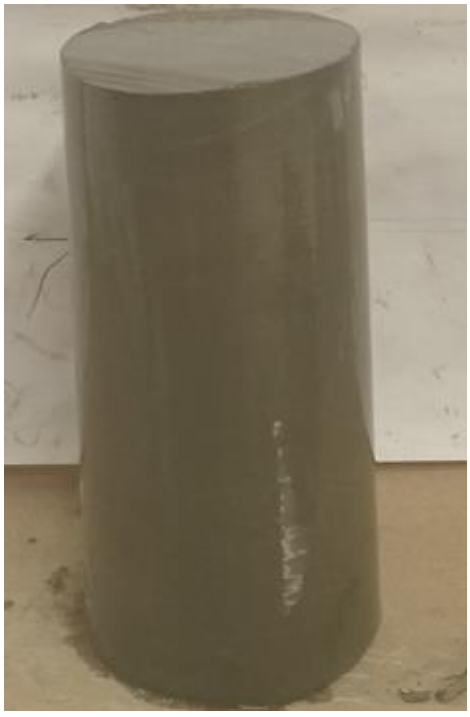
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	27/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very weak SANDSTONE
Sample reference:	BH2B_1104
Sample depth (m):	39.78-42.00
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 23-UCS
Client ref number:	1-C2466.16

Test photos

Before Test



Post Test

-

Date tested: 29/09/25

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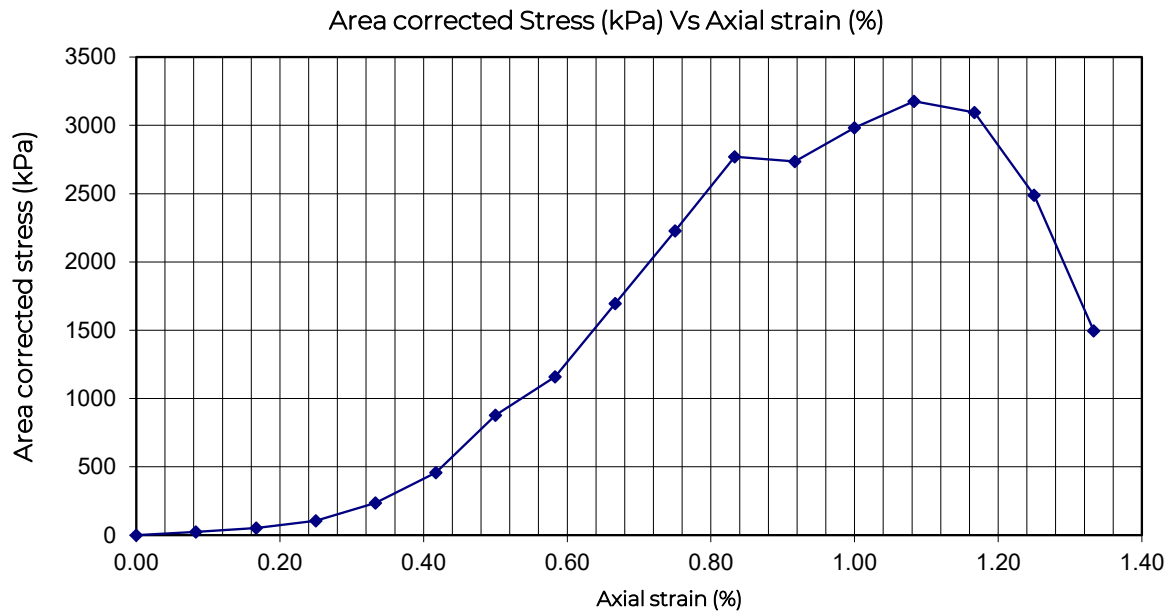
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	3/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very weak calcareous SILTSTONE
Sample reference:	BH2B_1105
Sample depth (m):	17.40-17.90
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 31-UCS
Client ref number:	1-C2466.16

Test results

Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.25	Water content as received (%)	11.8
Water content at compaction (%)	-	Initial sample diameter (mm)	60.0
Water content at testing (%)	11.8	Initial sample length (mm)	120.0
Dry density (t/m³)	2.05	Initial sample area (mm²)	2827.4
UCS Max stress (kPa)	3200	Initial Length:Diameter ratio	2:1
Strain at failure (%)	1.1	* Young's modulus (MPa)	556
Mode of failure:	Multiple Fracturing	for strain range	0.42 - 0.83%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	3/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very weak calcareous SILTSTONE
Sample reference:	BH2B_1105
Sample depth (m):	17.40-17.90
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 31-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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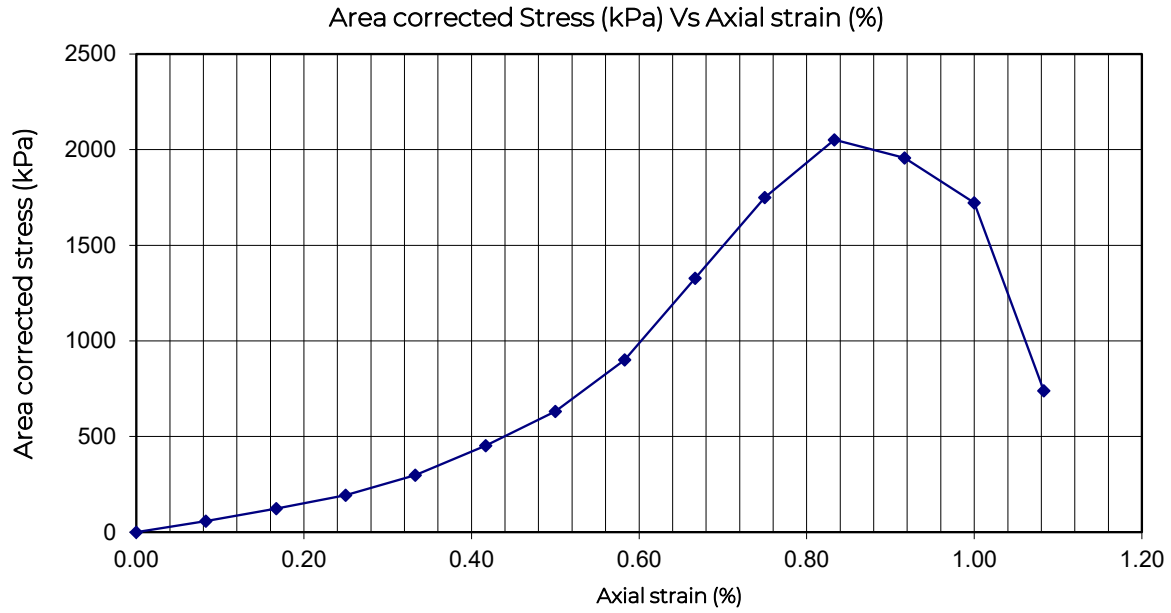
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	4/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very Weak Calcareous SILTSTONE
Sample reference:	BH2B_1105
Sample depth (m):	21.60-22.00
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 32-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.25	Water content as received (%)	10.9
Water content at compaction (%)	-	Initial sample diameter (mm)	60.1
Water content at testing (%)	10.9	Initial sample length (mm)	120.0
Dry density (t/m³)	2.05	Initial sample area (mm²)	2835.0
UCS Max stress (kPa)	2100	Initial Length:Diameter ratio	2:1
Strain at failure (%)	0.83	* Young's modulus (MPa)	426
Mode of failure:	Shear	for strain range	0.50 - 0.83%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	4/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very Weak Calcareous SILTSTONE
Sample reference:	BH2B_1105
Sample depth (m):	21.60-22.00
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 32-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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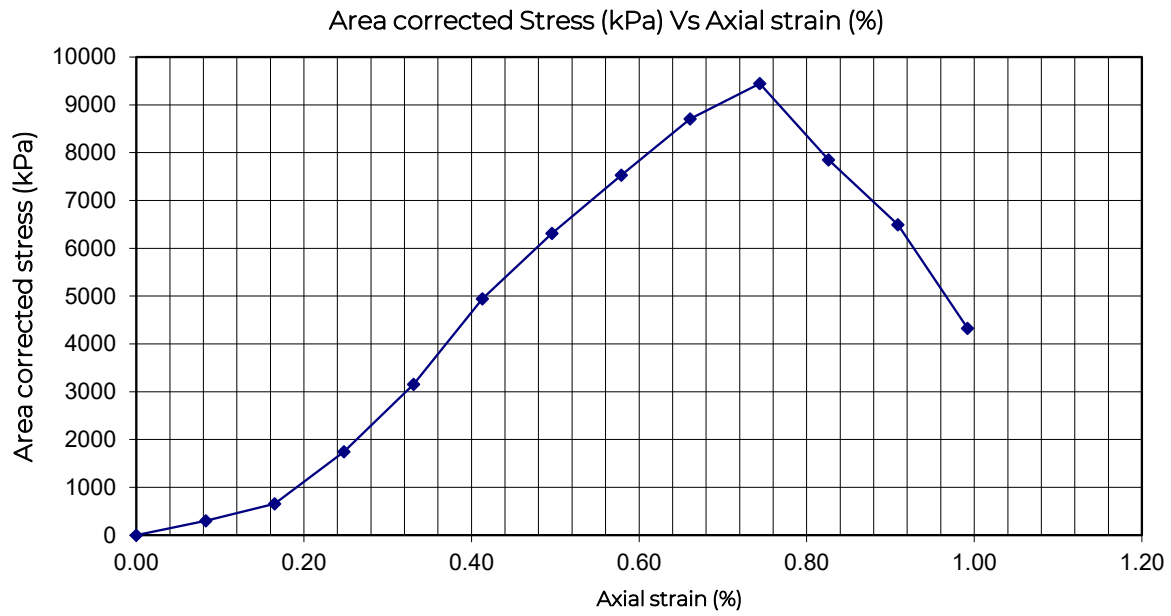
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	4/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1105
Sample depth (m):	38.25-38.60
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 34-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.50	Water content as received (%)	5.9
Water content at compaction (%)	-	Initial sample diameter (mm)	60.1
Water content at testing (%)	5.9	Initial sample length (mm)	121.0
Dry density (t/m³)	2.35	Initial sample area (mm²)	2835.9
UCS Max stress (kPa)	9400	Initial Length:Diameter ratio	2.01:1
Strain at failure (%)	0.74	* Young's modulus (MPa)	1623
Mode of failure:	Shear Along Side Plane	for strain range	0.17 - 0.66%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date : 17/10/25

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	4/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1105
Sample depth (m):	38.25-38.60
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 34-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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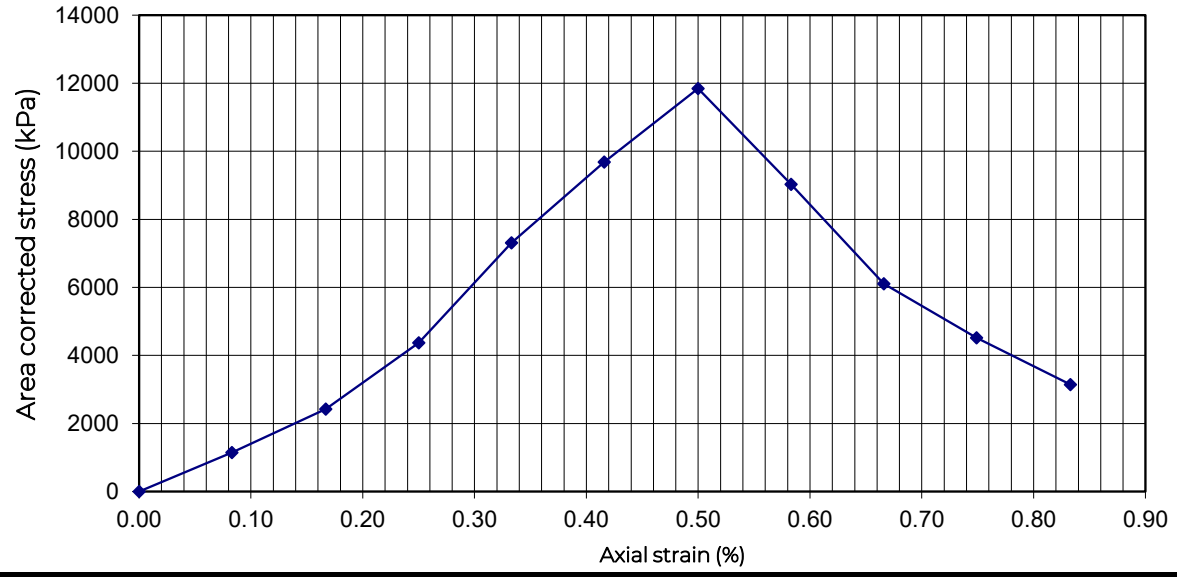
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Alternative to Brynderwyn Hills Section
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	26/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	SANDSTONE
Sample reference:	BH2B_1106
Sample depth (m):	28.30-28.50
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 10-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.80	Water content as received (%)	0.4
Water content at compaction (%)	-	Initial sample diameter (mm)	60.1
Water content at testing (%)	0.4	Initial sample length (mm)	120.1
Dry density (t/m³)	2.80	Initial sample area (mm²)	2834.0
UCS Max stress (kPa)	12000	Initial Length:Diameter ratio	2:1
Strain at failure (%)	0.5	* Young's modulus (MPa)	2369
Mode of failure:	Shear	for strain range	0.00 - 0.50%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	-Method requires 5-10mins failure time. This test deviates from that.
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 24/11/25
Date reported 14/01/26

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

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Date : 14/01/26

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Alternative to Brynderwyn Hills Section
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	26/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	SANDSTONE
Sample reference:	BH2B_1106
Sample depth (m):	28.30-28.50
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/10-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 24/11/25

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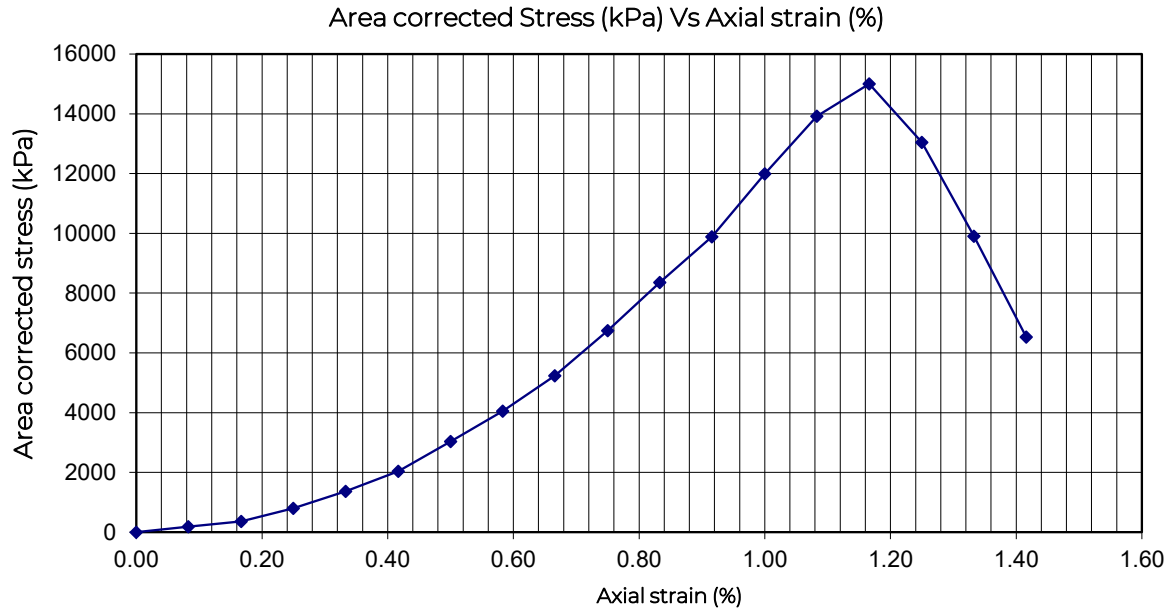
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2 - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	16/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1117
Sample depth (m):	21.60-21.90
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 72-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.75	Water content as received (%)	14.8
Water content at compaction (%)	-	Initial sample diameter (mm)	60.1
Water content at testing (%)	14.8	Initial sample length (mm)	120.0
Dry density (t/m³)	2.40	Initial sample area (mm²)	2833.1
UCS Max stress (kPa)	15000	Initial Length:Diameter ratio	2:1
Strain at failure (%)	1.2	* Young's modulus (MPa)	1974
Mode of failure:	Shear	for strain range	0.58 - 1.08%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 28/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date : 28/10/25

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2 - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	16/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1117
Sample depth (m):	21.60-21.90
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 72-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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New Zealand

Website www.wsp.com/nz

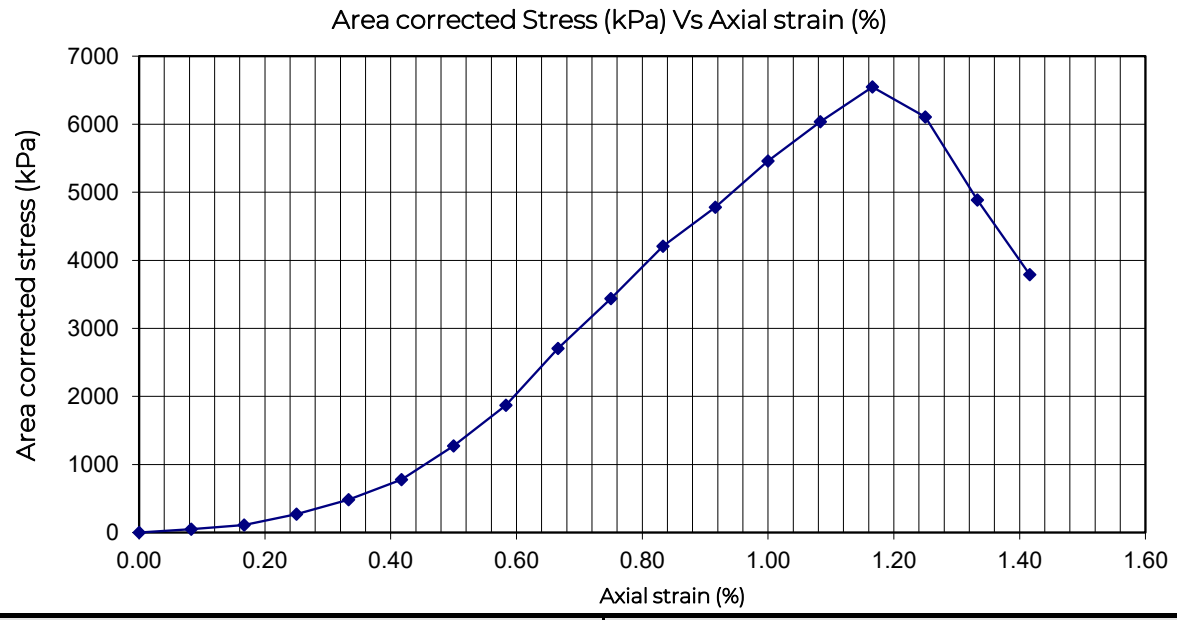
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Alternative to Brynderwyn Hills Section
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	23/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak UW SILTSTONE
Sample reference:	BH2B_1122
Sample depth (m):	23.50-23.80
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 39-UCS
Client ref number:	1-C2466.16

Test results

Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.30	Water content as received (%)	9.8
Water content at compaction (%)	-	Initial sample diameter (mm)	60.0
Water content at testing (%)	9.8	Initial sample length (mm)	120.0
Dry density (t/m³)	2.10	Initial sample area (mm²)	2828.4
UCS Max stress (kPa)	6500	Initial Length:Diameter ratio	2:1
Strain at failure (%)	1.2	* Young's modulus (MPa)	770
Mode of failure:	Multiple Fracturing	for strain range	0.42 - 1.17%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 24/11/25
Date reported 23/12/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

This report may only be reproduced in full.

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 23/12/25

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

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7A Ride Way
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Website www.wsp.com/nz

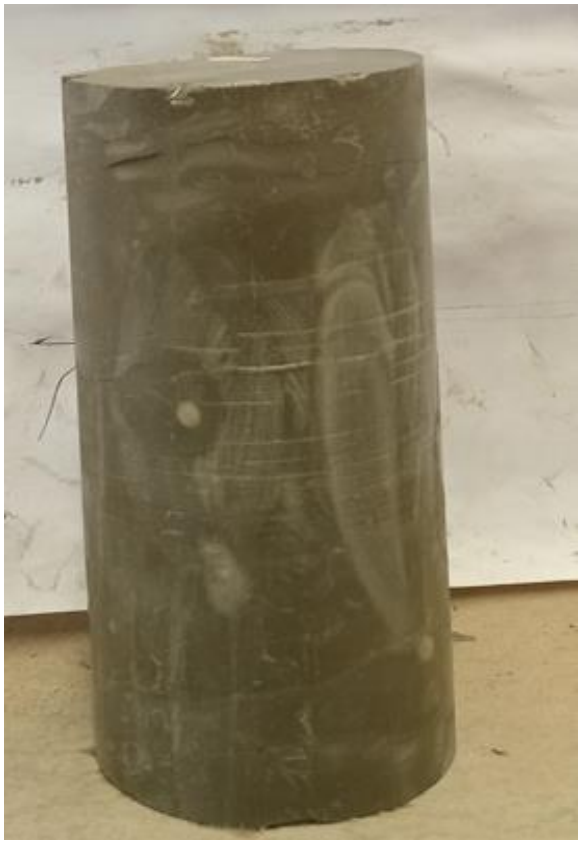
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Alternative to Brynderwyn Hills Section
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	23/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak UW SILTSTONE
Sample reference:	BH2B_1122
Sample depth (m):	23.50-23.80
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 39-UCS
Client ref number:	1-C2466.16

Test photos

Before Test



Post Test

-

Date tested: 24/11/25

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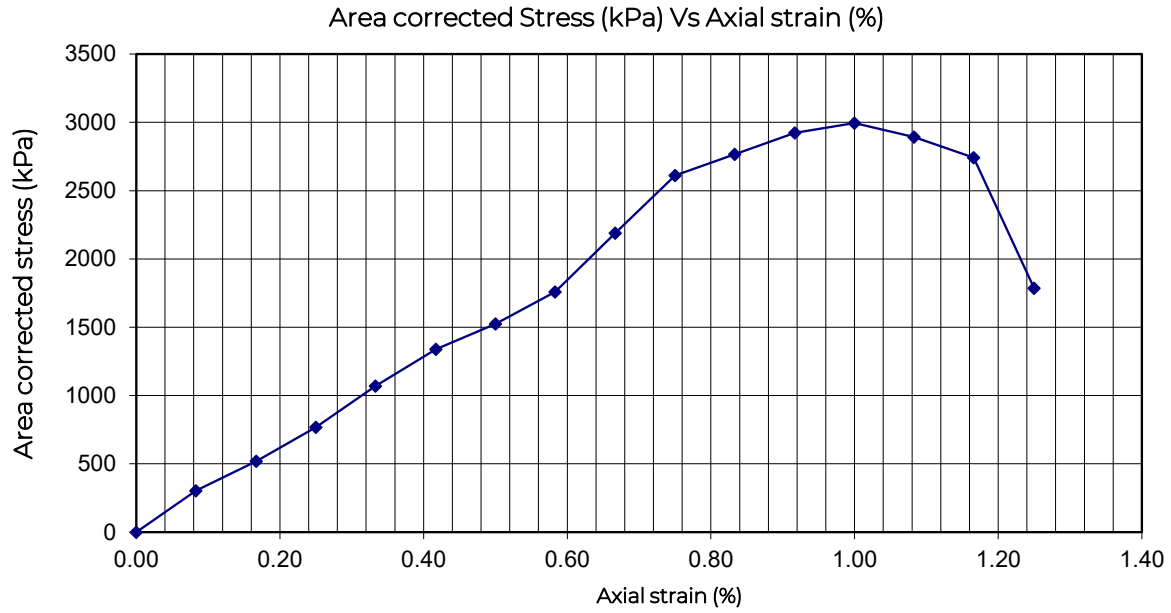
Website www.wsp.com/nz

UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	10/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very weak SILTSTONE
Sample reference:	BH2B_1140
Sample depth (m):	21.00-21.61
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 80-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.20	Water content as received (%)	12.7
Water content at compaction (%)	-	Initial sample diameter (mm)	60.0
Water content at testing (%)	12.7	Initial sample length (mm)	120.0
Dry density (t/m³)	1.95	Initial sample area (mm²)	2827.4
UCS Max stress (kPa)	3000	Initial Length:Diameter ratio	2:1
Strain at failure (%)	1	* Young's modulus (MPa)	348
Mode of failure:	Shear Along Side Plane	for strain range	0.00 - 0.75%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	10/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very weak SILTSTONE
Sample reference:	BH2B_1140
Sample depth (m):	21.00-21.61
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 80-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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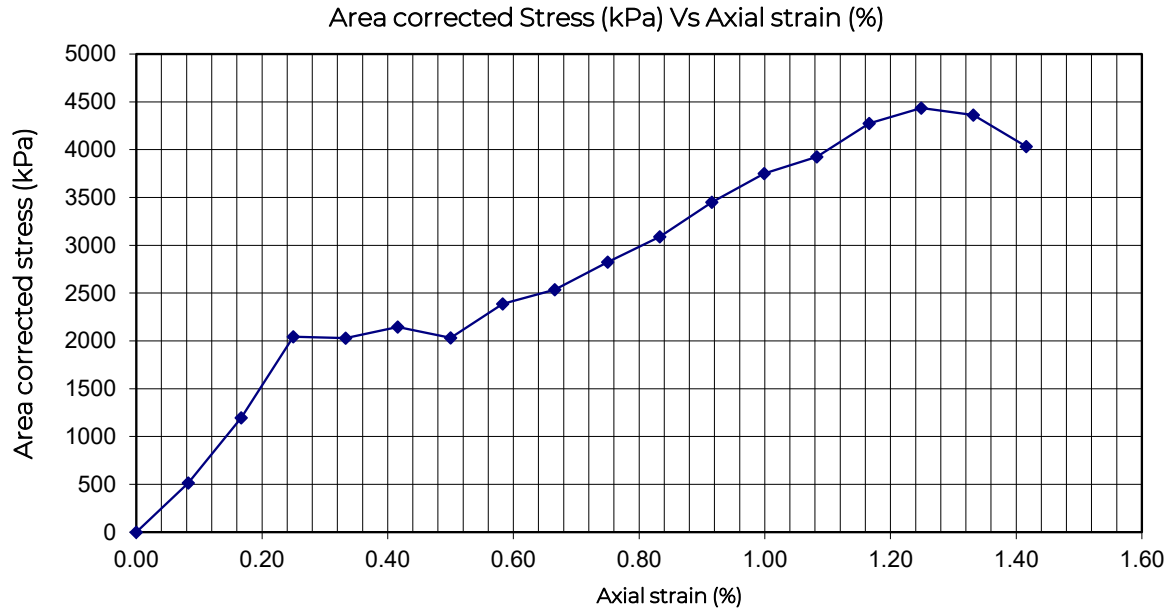
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	10/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very weak SANDSTONE
Sample reference:	BH2B_1140
Sample depth (m):	24.00-24.38
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 81-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.30	Water content as received (%)	10.8
Water content at compaction (%)	-	Initial sample diameter (mm)	60.0
Water content at testing (%)	10.8	Initial sample length (mm)	120.1
Dry density (t/m³)	2.05	Initial sample area (mm²)	2831.2
UCS Max stress (kPa)	4400	Initial Length:Diameter ratio	2:1
Strain at failure (%)	1.2	* Young's modulus (MPa)	817
Mode of failure:	Shear	for strain range	0.00 - 0.25%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

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Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	10/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Very weak SANDSTONE
Sample reference:	BH2B_1140
Sample depth (m):	24.00-24.38
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 81-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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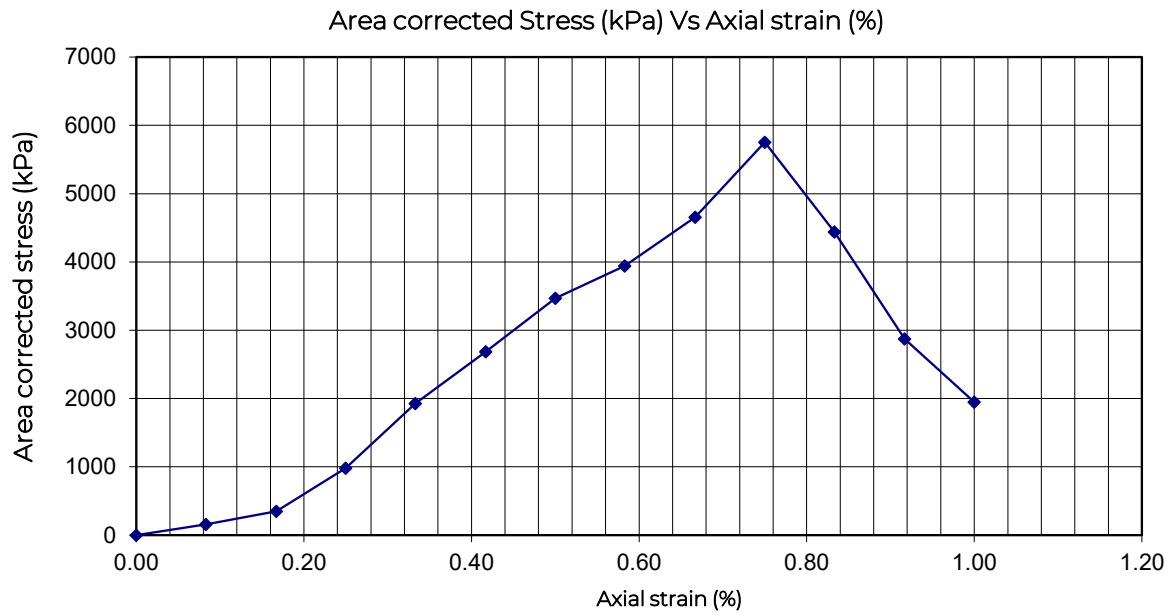
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	11/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SILTSTONE
Sample reference:	BH2B_1140
Sample depth (m):	29.20-29.80
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 82-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.35	Water content as received (%)	11.2
Water content at compaction (%)	-	Initial sample diameter (mm)	60.0
Water content at testing (%)	11.2	Initial sample length (mm)	120.0
Dry density (t/m³)	2.10	Initial sample area (mm²)	2831.2
UCS Max stress (kPa)	5800	Initial Length:Diameter ratio	2:1
Strain at failure (%)	0.75	* Young's modulus (MPa)	927
Mode of failure:	Columnar	for strain range	0.17 - 0.75%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

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Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	11/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SILTSTONE
Sample reference:	BH2B_1140
Sample depth (m):	29.20-29.80
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 82-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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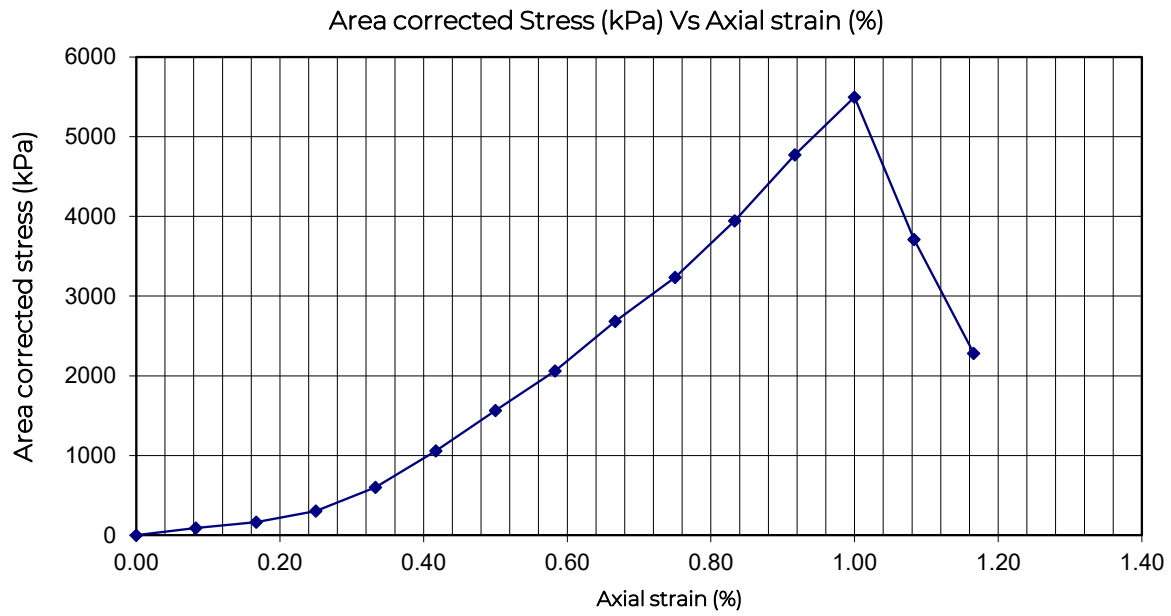
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	29/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak GREYWACKE SANDSTONE
Sample reference:	BH2B_1144
Sample depth (m):	33.37-33.77
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 54-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.65	Water content as received (%)	1.5
Water content at compaction (%)	-	Initial sample diameter (mm)	60.1
Water content at testing (%)	1.5	Initial sample length (mm)	120.0
Dry density (t/m³)	2.60	Initial sample area (mm²)	2835.0
UCS Max stress (kPa)	5500	Initial Length:Diameter ratio	2:1
Strain at failure (%)	1	* Young's modulus (MPa)	734
Mode of failure:	Shear	for strain range	0.33 - 1.00%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

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Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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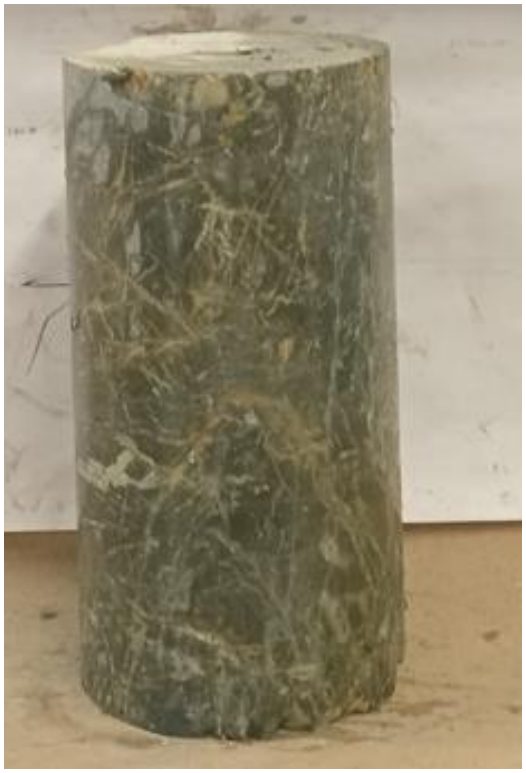
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	29/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak GREYWACKE SANDSTONE
Sample reference:	BH2B_1144
Sample depth (m):	33.37-33.77
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 54-UCS
Client ref number:	1-C2466.16

Test photos

Before Test



Post Test

-

Date tested: 29/09/25

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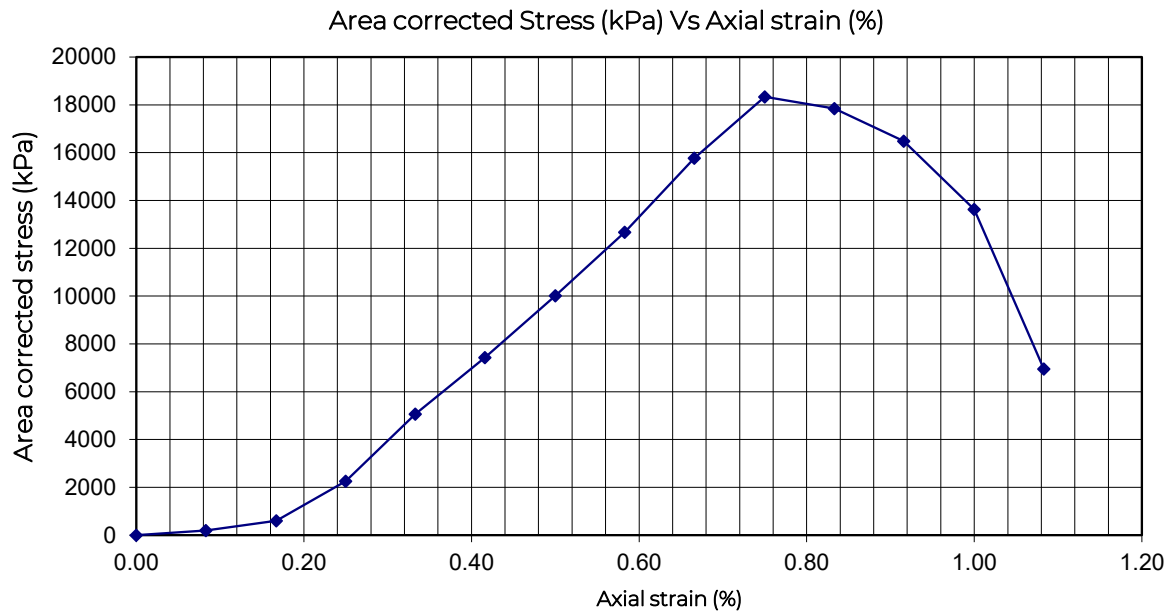
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	29/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak Greywacke SANDSTONE
Sample reference:	BH2B_1144
Sample depth (m):	35.22-35.50
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 55-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.60	Water content as received (%)	0.5
Water content at compaction (%)	-	Initial sample diameter (mm)	61.0
Water content at testing (%)	0.5	Initial sample length (mm)	120.1
Dry density (t/m³)	2.55	Initial sample area (mm²)	2922.5
UCS Max stress (kPa)	18000	Initial Length:Diameter ratio	1.97:1
Strain at failure (%)	0.75	* Young's modulus (MPa)	3043
Mode of failure:	Columnar	for strain range	0.17 - 0.75%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

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Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	29/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak Greywacke SANDSTONE
Sample reference:	BH2B_1144
Sample depth (m):	35.22-35.50
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 55-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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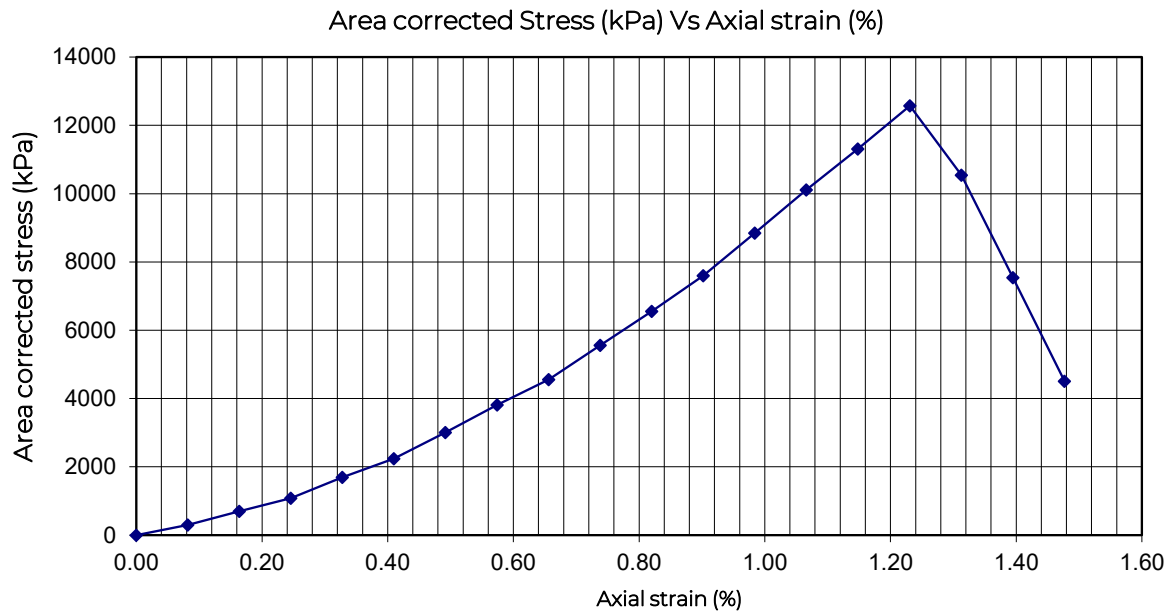
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2 - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	29/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak GREYWACKE SANDSTONE
Sample reference:	BH2B_1144
Sample depth (m):	54.20-54.40
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 24-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.75	Water content as received (%)	0.9
Water content at compaction (%)	-	Initial sample diameter (mm)	60.1
Water content at testing (%)	0.9	Initial sample length (mm)	121.9
Dry density (t/m³)	2.75	Initial sample area (mm²)	2835.0
UCS Max stress (kPa)	13000	Initial Length:Diameter ratio	2.03:1
Strain at failure (%)	1.2	* Young's modulus (MPa)	1394
Mode of failure:	Shear	for strain range	0.66 - 1.23%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 22/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date : 22/10/25

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2 - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	29/08/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak GREYWACKE SANDSTONE
Sample reference:	BH2B_1144
Sample depth (m):	54.20-54.40
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 24-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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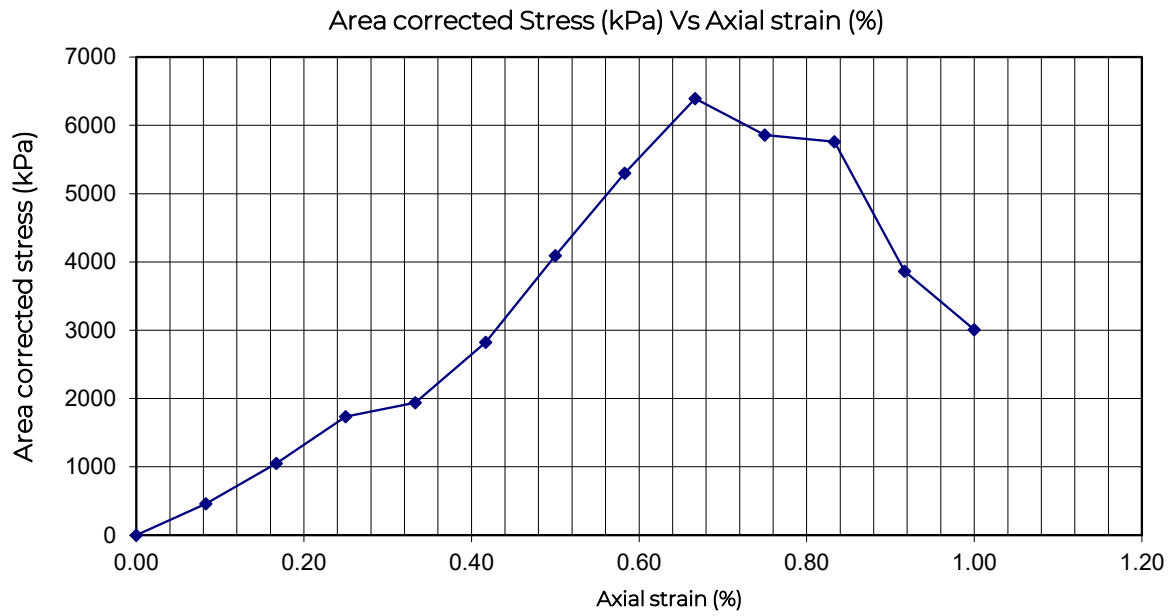
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	3/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1145
Sample depth (m):	27.00-27.60
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 89-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.30	Water content as received (%)	8.7
Water content at compaction (%)	-	Initial sample diameter (mm)	61.0
Water content at testing (%)	8.7	Initial sample length (mm)	120.0
Dry density (t/m³)	2.15	Initial sample area (mm²)	2922.5
UCS Max stress (kPa)	6400	Initial Length:Diameter ratio	1.97:1
Strain at failure (%)	0.67	* Young's modulus (MPa)	1333
Mode of failure:	Cone & Shear	for strain range	0.33 - 0.67%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	3/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1145
Sample depth (m):	27.00-27.60
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 89-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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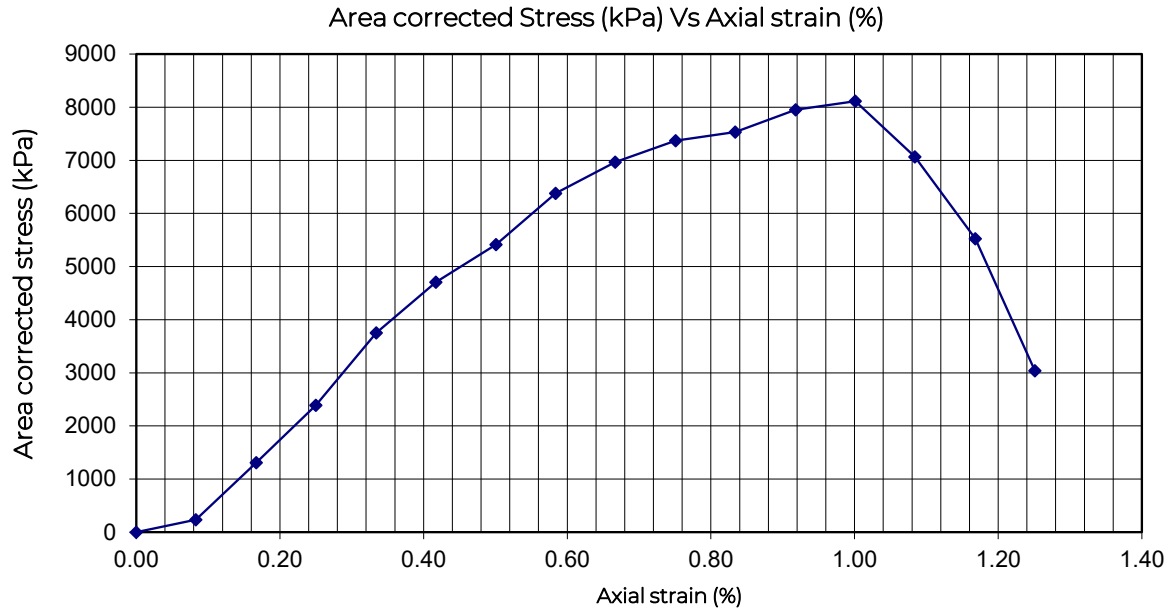
Website www.wsp.com/nz

UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	4/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1145
Sample depth (m):	36.00-36.53
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 88-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.30	Water content as received (%)	7.8
Water content at compaction (%)	-	Initial sample diameter (mm)	61.0
Water content at testing (%)	7.8	Initial sample length (mm)	119.9
Dry density (t/m³)	2.15	Initial sample area (mm²)	2922.5
UCS Max stress (kPa)	8100	Initial Length:Diameter ratio	1.97:1
Strain at failure (%)	1	* Young's modulus (MPa)	1400
Mode of failure:	Multiple Fracturing	for strain range	0.08 - 0.33%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date : 17/10/25

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	4/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1145
Sample depth (m):	36.00-36.53
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 88-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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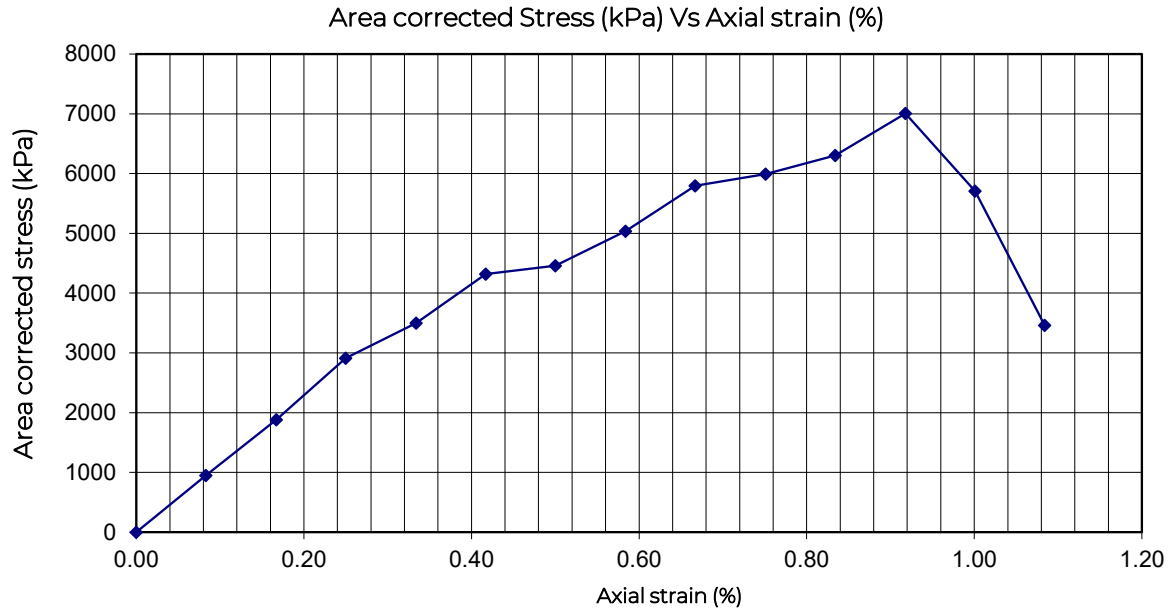
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	4/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1145
Sample depth (m):	36.53-37.08
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 87-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.25	Water content as received (%)	7.8
Water content at compaction (%)	-	Initial sample diameter (mm)	61.0
Water content at testing (%)	7.8	Initial sample length (mm)	119.9
Dry density (t/m³)	2.10	Initial sample area (mm²)	2922.5
UCS Max stress (kPa)	7000	Initial Length:Diameter ratio	1.97:1
Strain at failure (%)	0.92	* Young's modulus (MPa)	1165
Mode of failure:	Shear Along Side Plane	for strain range	0.00 - 0.25%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 17/10/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	4/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1145
Sample depth (m):	36.53-37.08
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 87-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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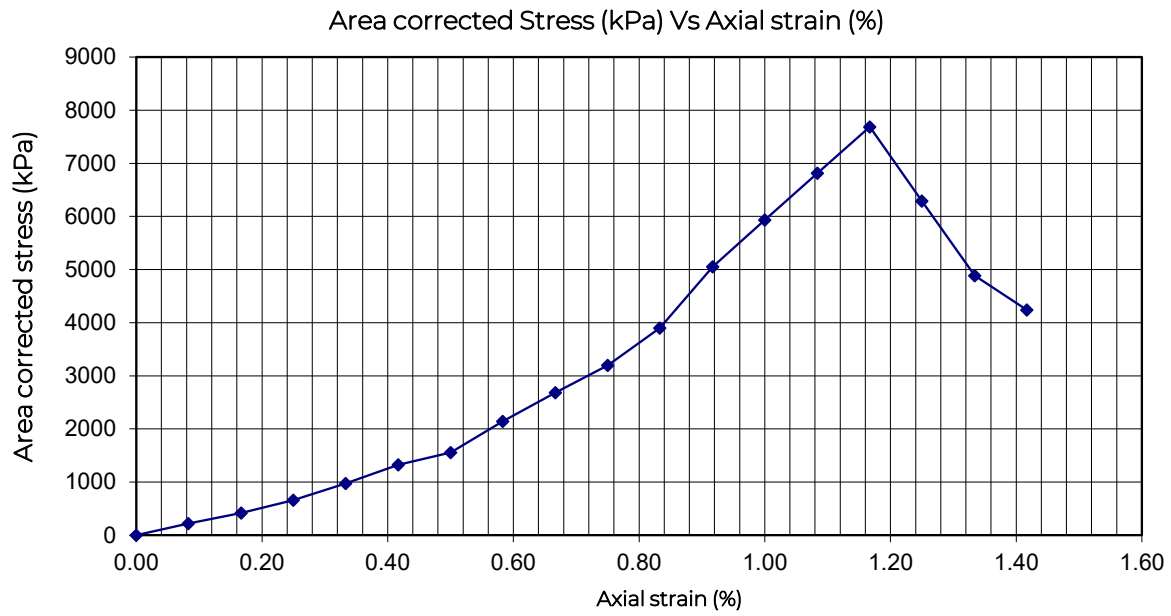
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	10/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1151
Sample depth (m):	13.95-14.53
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 97-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.30	Water content as received (%)	8.7
Water content at compaction (%)	-	Initial sample diameter (mm)	61.0
Water content at testing (%)	8.7	Initial sample length (mm)	120.0
Dry density (t/m³)	2.15	Initial sample area (mm²)	2924.4
UCS Max stress (kPa)	7700	Initial Length:Diameter ratio	1.97:1
Strain at failure (%)	1.2	* Young's modulus (MPa)	1077
Mode of failure:	Shear	for strain range	0.75 - 1.17%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date : 17/10/25

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

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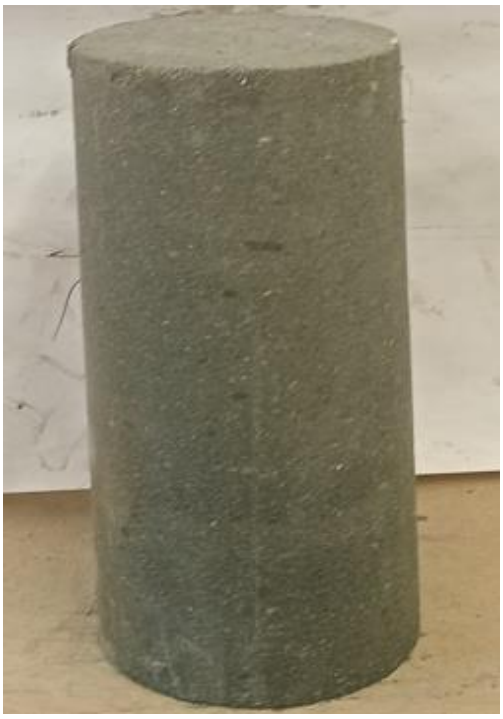
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	10/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak SANDSTONE
Sample reference:	BH2B_1151
Sample depth (m):	13.95-14.53
Age at test:	-

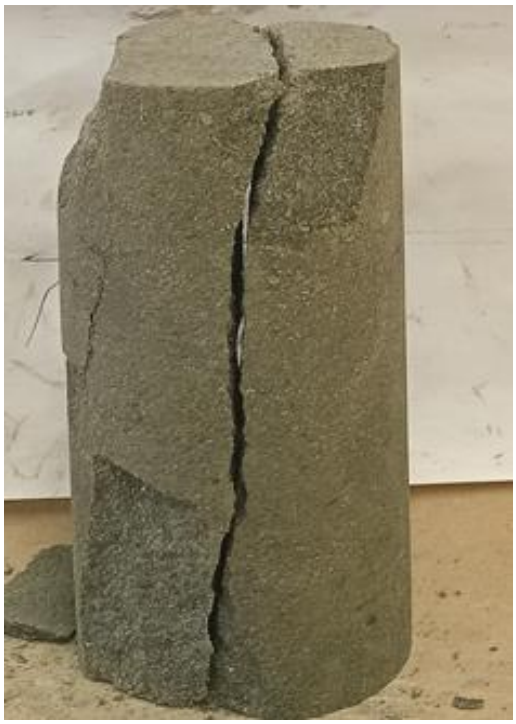
Project number:	1-C2466.16
Lab ref number:	WL4708/ 97-UCS
Client ref number:	1-C2466.16

Test photos

Before Test



Post Test



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Date tested: 29/09/25

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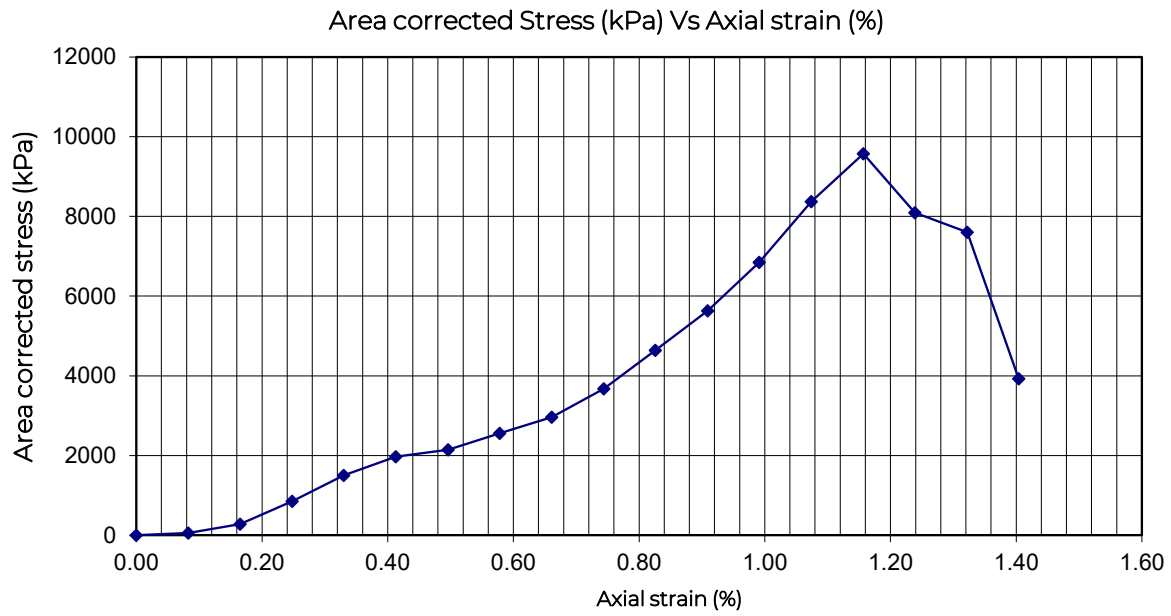
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2 - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	11/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak Conglomeratic SANDSTONE
Sample reference:	BH2B_1151
Sample depth (m):	26.15-26.60
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 96-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.35	Water content as received (%)	6.4
Water content at compaction (%)	-	Initial sample diameter (mm)	61.2
Water content at testing (%)	6.4	Initial sample length (mm)	121.0
Dry density (t/m³)	2.25	Initial sample area (mm²)	2941.7
UCS Max stress (kPa)	9600	Initial Length:Diameter ratio	1.98:1
Strain at failure (%)	1.2	* Young's modulus (MPa)	1333
Mode of failure:	Cone & Split	for strain range	0.66 - 1.16%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.3mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 28/10/25

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Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

Date : 28/10/25

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UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2 - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	11/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak Conglomeratic SANDSTONE
Sample reference:	BH2B_1151
Sample depth (m):	26.15-26.60
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 96-UCS
Client ref number:	1-C2466.16

Test photos

Before Test

Post Test

-

Date tested: 29/09/25

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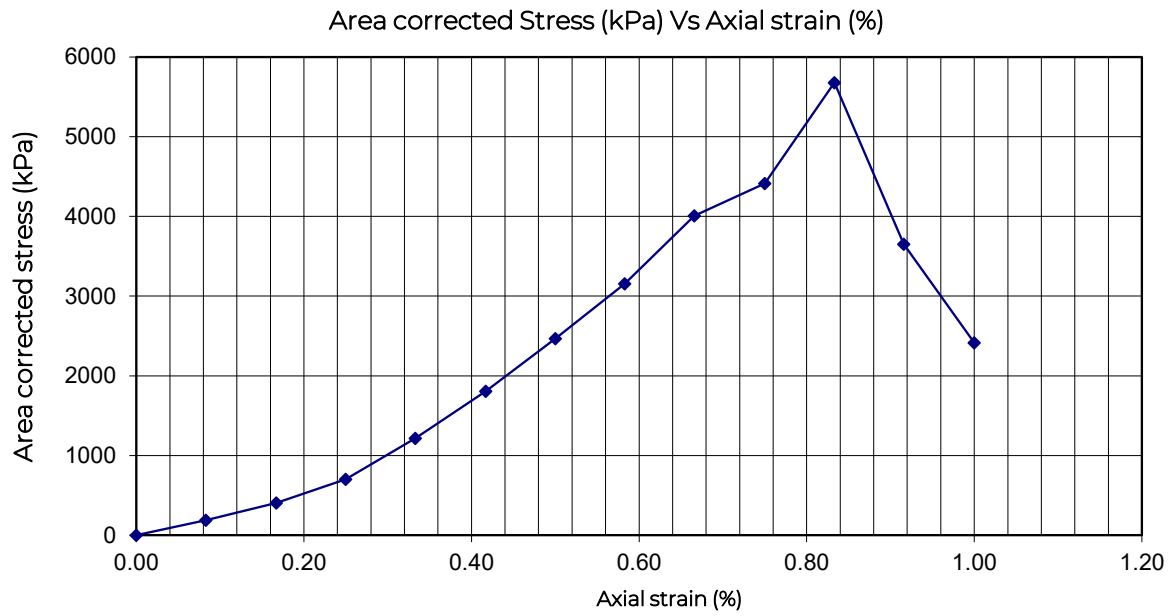
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	11/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak Conglomeratic SANDSTONE
Sample reference:	BH2B_1151
Sample depth (m):	31.82-32.15
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 95-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.40	Water content as received (%)	6.1
Water content at compaction (%)	-	Initial sample diameter (mm)	61.0
Water content at testing (%)	6.1	Initial sample length (mm)	120.0
Dry density (t/m³)	2.25	Initial sample area (mm²)	2924.4
UCS Max stress (kPa)	5700	Initial Length:Diameter ratio	1.97:1
Strain at failure (%)	0.83	* Young's modulus (MPa)	854
Mode of failure:	Shear	for strain range	0.25 - 0.83%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 29/09/25
Date reported 17/10/25

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date : 17/10/25

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

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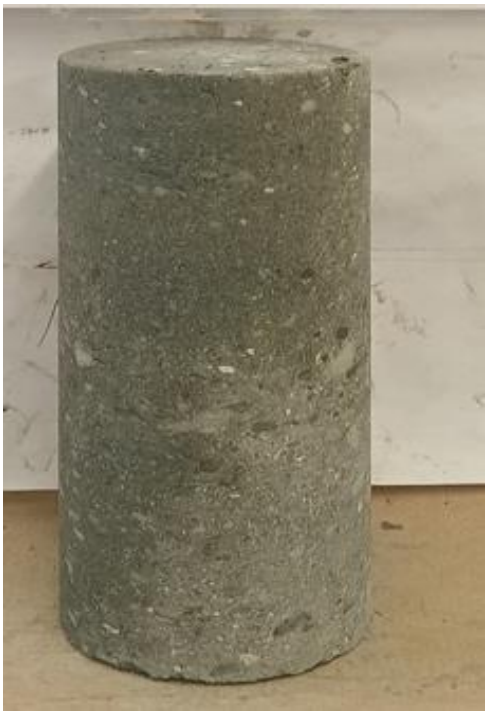
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Section 2B - Te Hana to Port Marsden Highway, Section 2B GI
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	11/09/25
Sampling method:	Core
Sample condition:	As received
Sample description:	Weak Conglomeratic SANDSTONE
Sample reference:	BH2B_1151
Sample depth (m):	31.82-32.15
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/ 95-UCS
Client ref number:	1-C2466.16

Test photos

Before Test



Post Test

-

Date tested: 29/09/25

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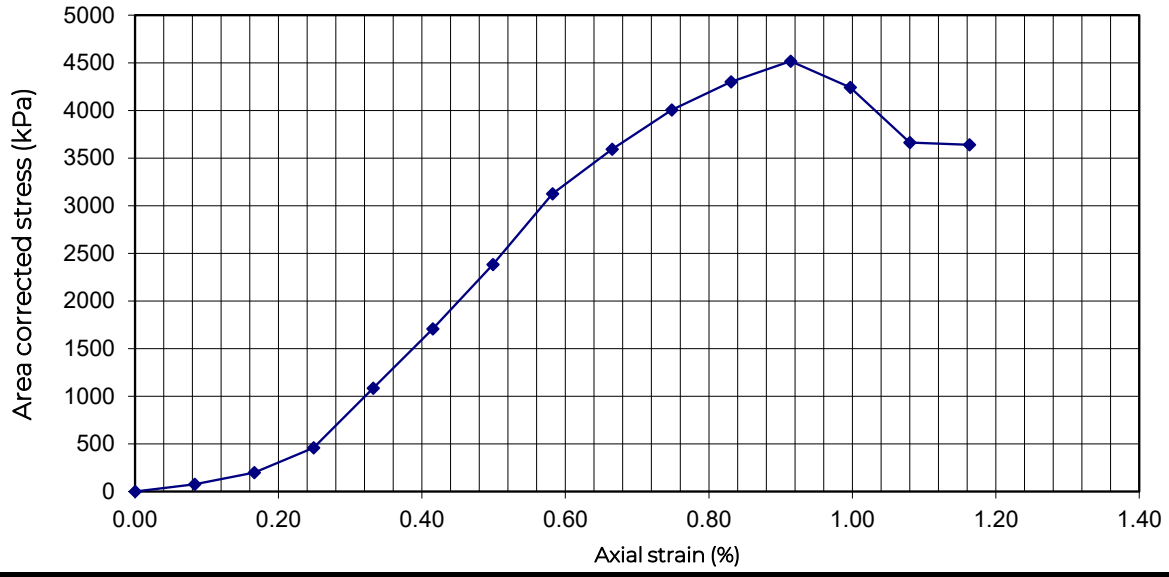
Website www.wsp.com/nz

UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Alternative to Brynderwyn Hills Section
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	29/10/25
Sampling method:	Core
Sample condition:	As received
Sample description:	SANDSTONE
Sample reference:	BH2B_1157
Sample depth (m):	31.25-31.50
Age at test:	-

Project number:	1-C2466.16
Lab ref number:	WL4708/200-UCS
Client ref number:	1-C2466.16

Test results			
Material size used	Whole sample	Wet mass passing size used (%)	-
Bulk density (t/m³)	2.15	Water content as received (%)	6.6
Water content at compaction (%)	-	Initial sample diameter (mm)	61.0
Water content at testing (%)	6.6	Initial sample length (mm)	120.3
Dry density (t/m³)	2.05	Initial sample area (mm²)	2927.3
UCS Max stress (kPa)	4500	Initial Length:Diameter ratio	1.97:1
Strain at failure (%)	0.91	* Young's modulus (MPa)	801
Mode of failure:	Shear	for strain range	0.25 - 0.58%



Test Methods		Notes
UCS:	NZS 4402: 1986: Test 6.3.1	
Water content:	NZS 4402: 1986: Test 2.1	-The strain rate for this test was kept constant at 0.2mm/min.
* Young's modulus is not covered by IANZ Accreditation.		-Some sample details supplied by client.

Date tested: 07/01/26
Date reported 14/01/26

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Date : 14/01/26

Approved Signatory *Thirushen Pillay*
Senior Civil Engineering Technician

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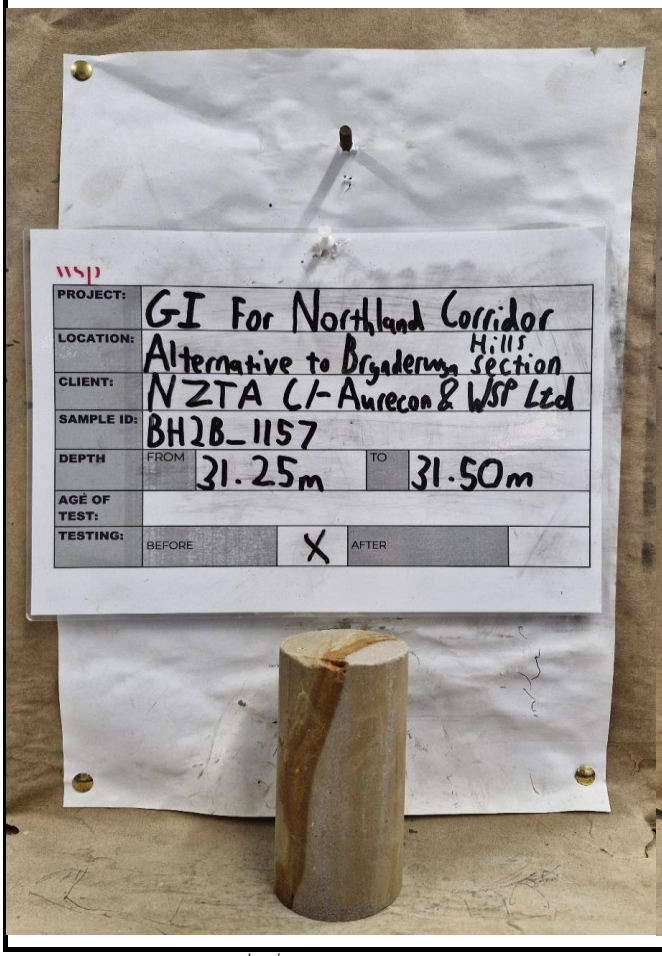
UNCONFINED COMPRESSIVE STRENGTH (UCS) WITH YOUNG'S MODULUS

Project:	Ground Investigation for Northland Corridor
Location:	Alternative to Brynderwyn Hills Section
Client:	NZTA c/- Aurecon & WSP NZ Ltd
Contractor:	N/A
Sampled by:	NC_Site Team
Date sampled:	29/10/25
Sampling method:	Core
Sample condition:	As received
Sample description:	SANDSTONE
Sample reference:	BH2B_1157
Sample depth (m):	31.25-31.50
Age at test:	-

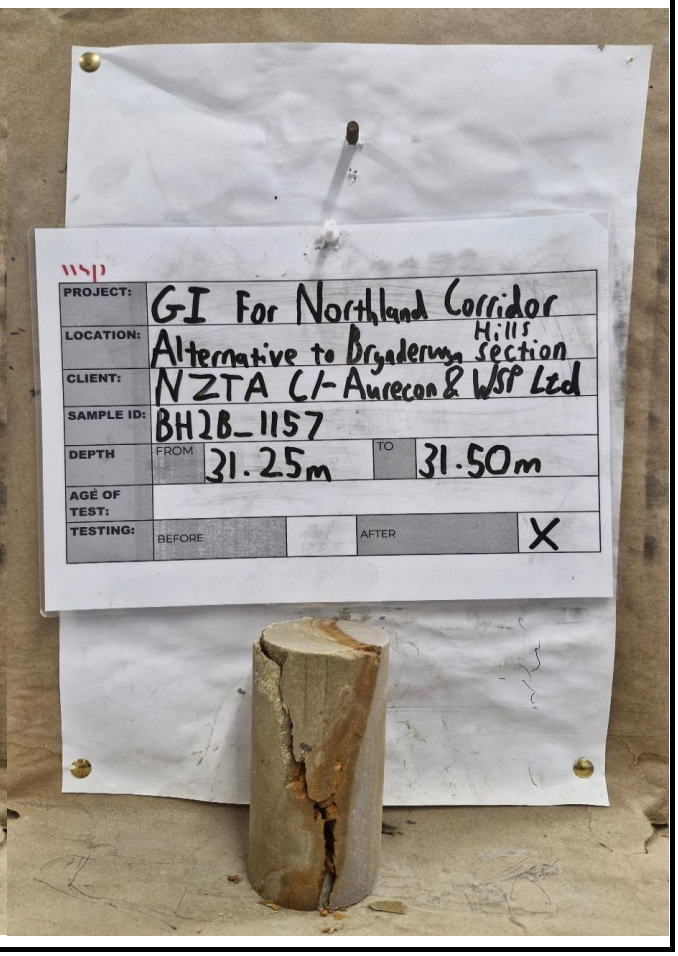
Project number:	1-C2466.16
Lab ref number:	WL4708/200-UCS
Client ref number:	1-C2466.16

Test photos

Before Test



Post Test



Date tested: 07/01/26

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