

Shrink - swell index TEST REPORT



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.
Specific depth: 3.00-3.50m
Sampled by: NC_Site Team Date sampled: 14/10/2025
Sampling method: Pushtube
Sample description: Clayey SILT; light brown; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1101
Sample depth: 3.00-3.50m
Specific depth: 3.00-3.50m

Project number: 1-C2466.16
Lab ref number: WL4708/112_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	4.2
Moisture Content (As Received)(%)	37.3
Moisture content of Core Shrinkage sample (%)	6.1
Moisture Content of Swell Sample (%)	18.3
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	0
Extent of Soil Crumbling during shrinkage:	Slight to Moderate
Extent of Cracking:	Slight to Moderate

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 01-11/12/25

Date reported : 18/12/2025

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 19/12/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 6.30-6.55m
Sampled by: NC_Site Team Date sampled: 2/09/2025
Sampling method: Pushtube
Sample description: Silty CLAY; greyish green; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1104A
Sample depth: 6.10-6.60m
Specific depth: 6.30-6.55m

Project number: 1-C2466.16
Lab ref number: WL4708/67_SS
Client Ref No: 1-C2466.16

Test Results

Iss	3.4
Moisture Content (As Received)(%)	33.5
Moisture content of Core Shrinkage sample (%)	4.9
Moisture Content of Swell Sample (%)	16.2
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	1
Extent of Soil Crumbling during shrinkage:	None
Extent of Cracking:	None

Test Methods

Shrink-swell index AS 1289.7.1.1 -2003
NZS 4402: 1986 2.1 - Determination of Water Content

Notes

Date tested : 29/09/25-07/10/25

Date reported : 11/10/2025

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Approved


Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 18/10/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 9.35-9.60m
Sampled by: NC_Site Team Date sampled: 20/08/2025
Sampling method: Pushtube
Sample description: Clayey SILT with traces of sand and organics; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1104A
Sample depth: 9.10-9.60m
Specific depth: 9.35-9.60m

Project number: 1-C2466.16
Lab ref number: WL4708/101_SS
Client Ref No: 1-C2466.16

Test Results

Iss	1.8
Moisture Content (As Received)(%)	29.4
Moisture content of Core Shrinkage sample (%)	3.9
Moisture Content of Swell Sample (%)	14.3
Visual Description of soil:	See Above
Estimated percentage of organic material (%):	4
Extent of Soil Crumbling during shrinkage:	None
Extent of Cracking:	None

Test Methods

Shrink-swell index AS 1289.7.1.1 -2003
NZS 4402: 1986 2.1 - Determination of Water Content

Notes

Date tested : 06-12/10/25
Date reported : 31/10/2025

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician
Date : 5/11/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 3.20-3.45m
Sampled by: NC_Site Team Date sampled: 3/09/2025
Sampling method: Pushtube
Sample description: Silty CLAY with minor organics; brown mottled black; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1105
Sample depth: 3.20-3.70m

Project number: 1-C2466.16
Lab ref number: WL4708/25_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	4.9
Moisture Content (As Received)(%)	52.6
Moisture content of Core Shrinkage sample (%)	4.5
Moisture Content of Swell Sample (%)	20.7
Visual Description of soil:	See Above
Estimated percentage of organic material (%):	2
Extent of Soil Crumbling during shrinkage:	None
Extent of Cracking:	None

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 04-12/11/25

Date reported : 19/11/2025

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Approved


Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 20/11/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 3.30-3.50m
Sampled by: NC_Site Team Date sampled: 8/10/2025
Sampling method: Pushtube
Sample description: Clayey SILT; brown mottled grey; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1107
Sample depth: 3.00-3.50m
Specific depth: 3.30-3.50m

Project number: 1-C2466.16
Lab ref number: WL4708/153_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	1.4
Moisture Content (As Received)(%)	43.5
Moisture content of Core Shrinkage sample (%)	5.8
Moisture Content of Swell Sample (%)	20.0
Visual Description of soil:	See Above
Estimated percentage of organic material (%):	1
Extent of Soil Crumbling during shrinkage:	Slight
Extent of Cracking:	Slight

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 10-18/11/25
Date reported : 19/11/2025

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician
Date : 23/11/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 3.00-3.35m
Sampled by: NC_Site Team Date sampled: 17/10/2025
Sampling method: Pushtube
Sample description: Silty CLAY; brown mottled orange; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1108
Sample depth: 3.00-3.50m
Specific depth: 3.00-3.35m

Project number: 1-C2466.16
Lab ref number: WL4708/160_SS
Client Ref No: 1-C2466.16

Test Results

Iss 6.1
Moisture Content (As Received)(%) 39.8
Moisture content of Core Shrinkage sample (%) 6.0
Moisture Content of Swell Sample (%) 16.1
Visual Description of soil: See Above
Estimated percentage of organic material (%): 5
Extent of Soil Crumbling during shrinkage: Slight
Extent of Cracking: Slight

Test Methods

Shrink-swell index AS 1289.7.1.1 -2003
NZS 4402: 1986 2.1 - Determination of Water Content

Notes

Date tested : 10-18/11/25
Date reported : 19/11/2025

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Approved

Thirushen Pillay
Designation : Senior Civil Engineering Technician
Date : 23/11/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 3.00-3.22m
Sampled by: NC_Site Team Date sampled: 30/10/2025
Sampling method: Pushtube
Sample description: CW-HW SILTSTONE
Sample condition: As Received
Sample reference: BH2B_1113
Sample depth: 3.00-3.50m
Specific depth: 3.00-3.22m

Project number: 1-C2466.16
Lab ref number: WL4708/167_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	1.1
Moisture Content (As Received)(%)	27.8
Moisture content of Core Shrinkage sample (%)	2.5
Moisture Content of Swell Sample (%)	13.7
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	1
Extent of Soil Crumbling during shrinkage:	Slight
Extent of Cracking:	Slight

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 26/11/25-02/12/25

Date reported : 18/12/2025

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 19/12/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 3.00-3.50m
Sampled by: NC_Site Team Date sampled: 28/08/2025
Sampling method: Pushtube
Sample description: Weathered SILT with clasts and traces of sand; orange mottled grey
Sample condition: As Received
Sample reference: BH2B_1117
Sample depth: 3.00-3.50m
Specific depth: 3.00-3.50m

Project number: 1-C2466.16
Lab ref number: WL4708/45_SS
Client Ref No: 1-C2466.16

Test Results

Iss	1.7
Moisture Content (As Received)(%)	65.3
Moisture content of Core Shrinkage sample (%)	6.8
Moisture Content of Swell Sample (%)	30.5
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	1
Extent of Soil Crumbling during shrinkage:	Slight to Moderate
Extent of Cracking:	Slight to Moderate

Test Methods

Shrink-swell index AS 1289.7.1.1 -2003
NZS 4402: 1986 2.1 - Determination of Water Content

Notes

Date tested : 15-23/10/25
Date reported : 31/10/2025

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Approved


Thirushen Pillay

Designation : Senior Civil Engineering Technician
Date : 4/11/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 3.28-3.50m
Sampled by: NC_Site Team Date sampled: 22/09/2025
Sampling method: Pushtube
Sample description: Silty CLAY with traces of sand; grey; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1122
Sample depth: 3.00-3.50m
Specific depth: 3.28-3.50m

Project number: 1-C2466.16
Lab ref number: WL4708/119_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	3.4
Moisture Content (As Received)(%)	35.1
Moisture content of Core Shrinkage sample (%)	3.6
Moisture Content of Swell Sample (%)	15.8
Visual Description of soil:	See Above
Estimated percentage of organic material (%):	1
Extent of Soil Crumbling during shrinkage:	Slight
Extent of Cracking:	Slight

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 05-12/11/25

Date reported : 19/11/2025

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Approved


Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 20/11/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 4.00-4.35m
Sampled by: NC_Site Team Date sampled: 16/09/2025
Sampling method: Pushtube
Sample description: Clayey SILT; Brown mottled grey; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1130
Sample depth: 4.00-4.50m
Specific depth: 4.00-4.35m

Project number: 1-C2466.16
Lab ref number: WL4708/107_SS
Client Ref No: 1-C2466.16

Test Results

Iss	1.5
Moisture Content (As Received)(%)	42.2
Moisture content of Core Shrinkage sample (%)	4.4
Moisture Content of Swell Sample (%)	19.8
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	1
Extent of Soil Crumbling during shrinkage:	Slight
Extent of Cracking:	Slight

Test Methods

Shrink-swell index AS 1289.7.1.1 -2003
NZS 4402: 1986 2.1 - Determination of Water Content

Notes

Date tested : 17-29/10/25
Date reported : 31/10/2025

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Approved

Thirushen Pillay
Designation : Senior Civil Engineering Technician
Date : 4/11/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 3.00-3.30m
Sampled by: NC_Site Team Date sampled: 10/09/2025
Sampling method: Pushtube
Sample description: Clayey SILT; grey mottled brown;moist; plastic
Sample condition: As Received
Sample reference: BH2B_1140
Sample depth: 3.00-3.50m
Specific depth: 3.00-3.30m

Project number: 1-C2466.16
Lab ref number: WL4708/75_SS
Client Ref No: 1-C2466.16

Test Results

Iss	1.8
Moisture Content (As Received)(%)	31.5
Moisture content of Core Shrinkage sample (%)	5.8
Moisture Content of Swell Sample (%)	16.1
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	3
Extent of Soil Crumbling during shrinkage:	Slight to Moderate
Extent of Cracking:	Slight to Moderate

Test Methods

Shrink-swell index AS 1289.7.1.1 -2003
NZS 4402: 1986 2.1 - Determination of Water Content

Notes

Date tested : 15-21/10/25
Date reported : 31/10/2025

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician
Date : 4/11/2025

Shrink - swell index TEST REPORT



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.
Specific depth: 6.10-6.30m
Sampled by: NC_Site Team Date sampled: 3/10/2025
Sampling method: Pushtube
Sample description: Silty CLAY; grey; moist
Sample condition: As Received
Sample reference: BH2B_1142
Sample depth: 6.00-6.50m
Specific depth: 6.10-6.30m

Project number: 1-C2466.16
Lab ref number: WL4708/149_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	5.1
Moisture Content (As Received)(%)	45.2
Moisture content of Core Shrinkage sample (%)	5.2
Moisture Content of Swell Sample (%)	20.3
Visual Description of soil:	See Above
Estimated percentage of organic material (%):	1
Extent of Soil Crumbling during shrinkage:	None
Extent of Cracking:	None

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 26/11/25-03/12/25

Date reported : 18/12/2025

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 7/01/2026

Shrink - swell index TEST REPORT



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.
Specific depth: 3.20-3.45m
Sampled by: NC_Site Team Date sampled: 23/10/2025
Sampling method: Pushtube
Sample description: Silty CLAY with traces of organics; grey; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1143
Sample depth: 3.00-3.50m
Specific depth: 3.20-3.45m

Project number: 1-C2466.16
Lab ref number: WL4708/170_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	7.8
Moisture Content (As Received)(%)	54.8
Moisture content of Core Shrinkage sample (%)	4.9
Moisture Content of Swell Sample (%)	22.3
Visual Description of soil:	See Above
Estimated percentage of organic material (%):	1-2
Extent of Soil Crumbling during shrinkage:	No Cracking
Extent of Cracking:	No Cracking

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 14-25/11/25

Date reported : 28/11/2025

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 28/11/2025

Shrink - swell index TEST REPORT



Project: Ground Investigation for Northland Corridor
Location: Alternative to Brynderwyn Hills Section
Client: NZTA C/- Aurecon & WSP NZ Ltd.
Specific depth: 3.00-3.30m
Sampled by: NC_Site Team Date sampled: 24/11/2025
Sampling method: Pushtube
Sample description: Silty CLAY; grey; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1146
Sample depth: 3.00-3.50m

Project number: 1-C2466.16
Lab ref number: WL4708/206_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	6.5
Moisture Content (As Received)(%)	52.6
Moisture content of Core Shrinkage sample (%)	6.5
Moisture Content of Swell Sample (%)	21.8
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	1
Extent of Soil Crumbling during shrinkage:	Slight Cracking
Extent of Cracking:	Slight Cracking

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 10-18/12/25

Date reported : 8/01/2026

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 9/01/2026

Shrink - swell index TEST REPORT



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.
Specific depth: 2.30-2.50m
Sampled by: NC_Site Team Date sampled: 23/10/2025
Sampling method: Pushtube
Sample description: Clayey SILT with traces of sand and rootlets; brown mottled black and grey
Sample condition: As Received
Sample reference: BH2B_1157
Sample depth: 2.00-2.50m
Specific depth: 2.30-2.50m

Project number: 1-C2466.16
Lab ref number: WL4708/180_SS
Client Ref No: 1-C2466.16

Test Results

Iss	0.8
Moisture Content (As Received)(%)	43.9
Moisture content of Core Shrinkage sample (%)	19.1
Moisture Content of Swell Sample (%)	18.7
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	1
Extent of Soil Crumbling during shrinkage:	Slight to Moderate
Extent of Cracking:	Slight to Moderate

Test Methods

Shrink-swell index AS 1289.7.1.1 -2003
NZS 4402: 1986 2.1 - Determination of Water Content

Notes

Date tested : 21-25/11/25
Date reported : 28/11/2025

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Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician
Date : 28/11/2025

Shrink - swell index TEST REPORT



Project: Ground Investigation for Northland Corridor
Location: Alternative to Brynderwyn Hills Section
Client: NZTA C/- Aurecon & WSP NZ Ltd.
Specific depth: 3.35-3.50m
Sampled by: NC_Site Team Date sampled: 29/10/2025
Sampling method: Pushtube
Sample description: Clayey sandy SILT; Grey mottled brown; moist; plastic
Sample condition: As Received
Sample reference: BH2B_1162
Sample depth: 3.00-3.50m
Specific depth: 3.35-3.50m

Project number: 1-C2466.16
Lab ref number: WL4708/187_SS
Client Ref No: 1-C2466.16

Test Results	
Iss	1.1
Moisture Content (As Received)(%)	41.5
Moisture content of Core Shrinkage sample (%)	7.2
Moisture Content of Swell Sample (%)	20.4
Visual Description of soil:	See Above
Estimated percentage of inert material (%):	1
Extent of Soil Crumbling during shrinkage:	Slight to moderate
Extent of Cracking:	Slight to moderate

Test Methods	Notes
Shrink-swell index AS 1289.7.1.1 -2003 NZS 4402: 1986 2.1 - Determination of Water Content	

Date tested : 10-15/12/25

Date reported : 18/12/2025

This report may only be reproduced in full

Approved

Thirushen Pillay

Designation : Senior Civil Engineering Technician

Date : 23/12/2025