

## SECTION 1 – GENERAL DETAILS

<b>Project Name:</b>	Peacocke Whatukooruru Drive	<b>ITP Number:</b>	104
<b>Project Number:</b>	DS1205	<b>ITP Status:</b>	Draft For Approval
<b>ITP Description:</b>	RETAINING WALLS	<b>Revision:</b>	E

<b>Contract Number:</b>	Peacocke Whatukooruru Drive	<b>Drawing Sets:</b>	Drawings 5200 - 5303
<b>Customer:</b>	Hamilton City Council	<b>Specification:</b>	Project Specification and Appendices.
<b>Quality Specified:</b>	NZTA Z/1		

Review / Update History					Verification Activity			
Rev:	Status:	Date:	Reviewed By:	Revision Details:	Activity Key		Responsibilities Key	
A	Draft for Approval	3/02/2023	Nairy Yaghobian	First Revision for Review and Approval	A	Action	ENG	Engineer / Engineer's Rep
					B	Report by Breach	CR	Customer Rep
B	Draft for Approval	2/03/2023	Zane Hawken	Incorporate comments from BBO	C	Check	PD	Project Director
					D	Dimension Inspection	PM	Project Manager
C	Draft for Approval	14/03/2023	Shahil Sharma	Incorporate Hold Points for Geogrid Installation and Proofroll	E	Examine	OP	Operations Manager
					HP	Hold Point (Engineer)	HSE	HSE Manager / Rep
D	Draft for Approval	11/05/2023	Shahil Sharma	Incorporate altered Drainage Design Detail	H	Hold Point (Internal)	QM	QA Manager / Rep
					I	Inspection	PE	Project Engineer
E	Draft for Approval	1/06/2023	Shahil Sharma	Incorporate comments from BBO	M	Monitor on Random Basis	SE	Site Engineer
					O	Operation	QE	Quality Engineer
					R	Review	SUP	Superintendent / Supervisor
					S	Subcontractor	SV	Surveyor
					V	Visual Verification	ITP	Third Party Inspector
					W	Witness Point	SPEC	Specialist

## SECTION 2A – ITP Approval

## SECTION 2B – ITP CLOSEOUT

Position	Name:	Signature:	Date:	Position	Name:	Signature:	Date:
Downer PM				Downer PM			
Downer QM				Downer QM			
Client (If Applicable)				Client (If Applicable)			

Item No.	Inspection and Test Point	Acceptance / Conformance Criteria	Standard / Specification	Verifying Document	Frequency	Verification Activity	
						Activity	By
SECTION 3 – PRE-CONSTRUCTION (P&G / ESTABLISHMENT)							
3.01 Site Requirements							
3.01.01	Construction Pack	Methodology and ITP to be submitted to the Engineer and approved prior to works beginning	Downer	Construction Pack	Submit 10 days prior to commencement of works	HP	ENG
3.01.02	Survey Setout	Survey Set out as per contract drawings and specification, capturing pre-construction levels where needed.	Downer	Survey Records	Prior to Works	H	SV
3.01.03	Service Location	Complete the Excavation permit process to identify, locate and protect all services.	Downer	Excavation Permit	Prior to Excavation	H	SE
3.01.04	Internal Permits	Complete internal Permits as required to complete works including but not limited to: Hot works, concrete saw, lift, confined space, working at height etc.	Downer	Internal Permits	Prior to Excavation	H	SE
3.01.05	External Permits	Obtain External Permits as required to complete works including but not limited to: Close approach, Worksafe Notice etc.	Downer	External Permits	Prior to Excavation	H	PE
3.01.06	Approved Construction Drawings	Prior to starting works, Ensure that the construction drawings are both IFC and the Current Version.	Downer	IFC Drawings	Prior to works start	H	PE
SECTION 4 – MATERIAL, PERSONNEL & THIRD PARTY APPROVAL – RETAINING WALLS							
4.01 Stone Strong retaining walls							
4.01.01	Stone Strong Block Molds	Stonestrong blocks to be supplied by an approved supplier.  The Contractor shall liaise with the Principal-appointed Cultural Artist to coordinate carving of the supplied blanks and the production of moulds & blocks	PS - 12	Conforming Molds Post Carving	Before Installation	H	PE
4.01.02	MSE retaining wall backfill and drainage Material	Backfill is to comprise a well graded, granular material such as GAP65 or site won Hinuera Sand, which must be free of any deleterious material. Sand backfill shall have a fines content (less than 0.075mm diameter) of no more than 10%.  Drainage metal to be 20/40 drainage aggregate or similar approved by engineer.  Labratory MDD (x2 per material type) at standard compaction	GWS - 5.3.3	Lab Results	Prior to works	H	PE
4.01.03	Geogrid	Geogrid to be Miragrid GX200/30 or similar approved	GWS - 5.3.1	Datasheet	Before Installation	H	PE
4.01.04	Para web	Paraweb to be the correct grade: Paraweb 2D-50	GWS - 5.3.2	Datasheet	Before Installation	H	PE
4.01.05	Drainage Pipes	Shall be 160mm diameter NZTA F/2 compliant smooth bore perforated corrugated pipe with filter sock	GWS - 5.3.4	Datasheet	Before Installation	H	PE
4.01.06	Geotextile	Shall be Bidim A39 geotextile or similar equivalent	SS - 12	Datasheet	Before Installation	H	PE
SECTION 5 – CONSTRUCTION ACTIVITY – RETAINING WALLS							

Item No.	Inspection and Test Point	Acceptance / Conformance Criteria	Standard / Specification	Verifying Document	Frequency	Verification Activity																										
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5.01 Load Transfer Platform																																
5.01.01	Excavation to subgrade	The foundation materials are to comprise natural Hinuera sand material, stiff Hinuera Silt or imported clean sand and must achieve a minimum of 4 blows per 100mm when tested with a Scala penetrometer. Any exposed silts must have vane shear strengths greater than 70kPa.	GWS - 5.2	Scala Results	Every 10m	H	SE																									
5.01.02	Foundation Approval	Results of the foundation material testing shall be supplied to the Engineer for approval and the prepared ground shall be inspected by the Engineer. Construction may not proceed until receiving Engineer’s approval.	GWS - 5.2	Approval	Prior to proceeding. Min 48h notice to Engineer	HP	ENG																									
5.01.03	Undercut subgrade	Any unsuitable materials, such as uncontrolled fill, contaminated materials or any weak or organic materials, shall be undercut and replaced with compacted granular fill (WHAP65 or equivalent) or Hinuera Sand. Surveyor to capture extent of undercut (if any) to include in asbuilt.	GWS - 5.2	Survey Record/ Photo record	If required	I	SE																									
5.01.04	Undercut backfill compaction	NDM (DT 300mm deep or backscatter with GAP65), with MDD of 95% or greater	GWS - Table 3	NDM Results	1 per 500m3 with at least 1 test per 0.5m lift per 20m run of wall	H	SE																									
5.01.05	Geogrid Installation	Geotextiles shall be placed in accordance with the Manufacturer’s instructions and installed as specified on the drawings. A minimum overlap of 500mm is required between sheets. Engineer to inspect 1 layer prior to backfill.	GWS - 4.1	Photo record	Each layer - 1 layer per abutment to be inspected	HP	ENG																									
5.01.06	Backfill Installation	All backfill is to be installed in 250mm lifts and compacted to the following standards.	GWS - 5.3.3	Photo record	Each layer	I	SUP																									
5.01.07	Backfill Compaction (NDM) (Gap 65)	NDM (DT 300mm deep or backscatter with GAP65), with MDD of 95% or greater	GWS - Table 3	NDM Results	1 per 500m3 with at least 1 test per 0.5m lift per 20m run of wall	H	SE																									
5.01.08	Clegg/Proofroll (Gap 65)	Proofroll of each layer. 4 Cleggs to be undertaken per NDM test. Engineer to proofroll/inspect final layer of load transfer platform.	GWS - Table 3	Clegg Result sheet	Each layer - final layer to be inspected	HP	ENG																									
5.01.09	Scala Penetrometer (Hinuera Sand)	Minimum average value over 5 tests of 5 blows per 100mm, minimum single value of 4 blows per 100mm	GWS - Table 3	Scala Results	1 per 500m3 1 test per 0.5m lift per 20m run of wall	H	SE																									
5.02 Stone Strong Wall Construction																																
5.02.01	Level founding platform	The Contractor shall construct a 200 mm thick levelling pad on top of the load transfer platform to create a level founding platform to accept the MSE retaining wall.	PS - 12	Site Photo / Checksheet	Prior to Stone Strong block installation	I	SUP																									
5.02.02	Installation of blocks	<div>Blocks to be installed to the height and location as detailed on the construction drawings. The table below details acceptable tolerances.</div> <table><tr><th colspan="5">Table 4: MSE Tolerances</th></tr><tr><th>Element</th><th>Vertical Position</th><th>Horizontal Position</th><th>Vertical Alignment</th><th>Horizontal Alignment</th></tr><tr><td>Soil Surface</td><td>±100mm</td><td>N/A</td><td>N/A</td><td>N/A</td></tr><tr><td>Facings and wall structures</td><td>±50mm</td><td>±50mm</td><td>±20mm in 3m</td><td>±20mm in 3m</td></tr><tr><td>Footings or supports</td><td>±50mm</td><td>±50mm</td><td>±20mm in 3m</td><td>±20mm in 3m</td></tr></table>	Table 4: MSE Tolerances					Element	Vertical Position	Horizontal Position	Vertical Alignment	Horizontal Alignment	Soil Surface	±100mm	N/A	N/A	N/A	Facings and wall structures	±50mm	±50mm	±20mm in 3m	±20mm in 3m	Footings or supports	±50mm	±50mm	±20mm in 3m	±20mm in 3m	GWS - 5.4	Site Photo / Checksheet	Each layer	I	SUP
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5.02.03	Paraweb Installation	<p>The correct number of parawebs are to be installed as shown on the construction drawings.</p> <p>Para web is to be placed flat or with a 1% fall toward the rear of the wall. The Para web must be free of wrinkles and lightly tensioned prior to and during placement of backfill. Shallow trench to be dug toward the end of the paraweb, pin to be used to pull paraweb taught prior to backfilling.</p> <p>The Para web must be continuous over the design embedment length and no joins are permitted unless adequately lapped and spliced according to the Manufacturer's instructions.</p> <p>150mm of fill cover is required before construction equipment can travel over the area</p>	GWS - 5.3.2	Site Photo / Checksheet	Each layer	I	SUP
5.02.04	Geotextile	<p>Geotextile to be placed against rear excavated face with a minimum overlap of 400mm between adjacent geotextile strips. Further Geotextile required to separate drainage aggregate and MSE wall backfill, if sand is used.</p> <p>Short widths of geotextile to be placed across the internal open join area on the rear face of each Stonestrong block join to contain internal block void hardfill.</p> <p>Geotextile to be used to block paraweb voids within Stonestrong blocks that are not in use.</p>	SS - 5	Site Photo	Each Layer	I	SUP
5.02.05	Drainage Installation	<p>Two x 160mm Drainage pipe wrapped in filter sock to be installed along the external perimeter of the Load Transfer Platform.</p> <p>Drainage aggregate to be placed along external perimeter of Load Transfer Platform for each MSE wall layer backfill, forming a Chimney Drain. Chimney Drain to be a minimum width of 300mm and extend to the base of the Load Transfer Platform.</p> <p>Internal block void hardfill to be 20/40 drainage aggregate or similar approved by engineer.</p> <p>Additional Drainage pipe wrapped in 0.75m3/m run of drainage metal only required beneath wall embedment at toe of the outside of the wall if the slope doesn't grade away from the toe of the wall.</p> <p>Drainage outlets shall be connected to the reticulated stormwater system or other approved outlet structure at the discretion of the design engineer</p>	SS - 5	Site Photo / Checksheet	During Installation	I	SUP
5.02.06	Backfill Installation	All backfill is to be installed in 250mm lifts and compacted to the following standards.	GWS - 5.3.3	Site Photo / Checksheet	Each layer	I	SUP
5.02.07	Nuclear Densometer (NDM) (Gap 65)	NDM (DT 300mm deep or backscatter with GAP65), with MDD of 95% or greater	GWS - Table 3	NDM Results	1 per 500m3 with at least 1 test per 0.5m lift per 20m run of wall	H	SE

## Retaining Walls Inspection and Test Plan

Project: Peacocke Whatukooruru Drive

Number and Revision: DS1205 - 104 - Rev E

Item No.	Inspection and Test Point	Acceptance / Conformance Criteria	Standard / Specification	Verifying Document	Frequency	Verification Activity	
						Activity	By
5.02.08	Clegg/Proofroll (Gap 65)	Proofroll of each layer. 4 Cleggs to be undertaken per NDM test.	GWS - Table 3	Clegg Result sheet	Each layer	H	SE
5.02.09	Scala Penetrometer (Hinuera Sand)	Minimum average value over 5 tests of 5 blows per 100mm, minimum single value of 4 blows per 100mm	GWS - Table 3	Scala Results	1 per 500m3 1 test per 0.5m lift per 20m run of wall	H	SE
<b>5.03 Survey Monitoring</b>							
5.03.01	Settlement Pins	Settlement pins shall be installed within 24 hours of reaching design subgrade level.  Survey measurements are to be undertaken to within an accuracy of 2mm. Results must be provided to the Engineer within 24 hours of each reading.	GWS - 6.3	Survey Results (in paper as well as electronic format)	Weekly for the first month, then monthly	R	SV ENG
5.03.02	Settlement Targets	Targets shall be fixed immediately after completion of the first row of retaining wall blocks at each location and the initial baseline survey reading made prior to the subsequent row of retaining wall blocks placed.  Survey measurements are to be undertaken to within an accuracy of 2mm. Results must be provided to the Engineer within 24 hours of each reading.	GWS - 6.4	Survey Results (in paper as well as electronic format)	Weekly for the first month, then monthly	R	SV ENG
5.03.03	Engineers Approval	Geotechnical engineer assesment required before commencement of Pavement construction	BBO	Written approval	Prior to pavement construction	HP	ENG
<b>SECTION 6 – POST CONSTRUCTION (FINAL INSPECTION AND HANDOVER)</b>							
<b>6.01 General</b>							
6.01.02	Draft As-Builts	Draft as-builts completed on the completion of MSE wall including red pen mark up to IFC drawing changes.  The draft as-builts shall be provided on a continual basis throughout the project for verification by the Engineer, and as a minimum shall be provided in electronic form prior to application for Practical Completion.	PS 2.2.17	Draft As-Builts Drawings	Prior to PC	H	SV / PE

**STONE STRONG WALL INSTALLATION CHECKLIST**

<b>Project Name:</b>	<b>Date:</b>
<b>Wall Location:</b>	<b>Inspector:</b>
<b>Block Layer:</b>	<b>RL of current Block/Backfill Layer:</b>

Level foundation installed as per design. (Base layer only)	Y	N	NA																												
2 x Drainage pipe wraped in filter sock to be installed along the external perimeter of the Load Transfer Platform. (Base layer only)	Y	N	NA																												
Blocks Installed within specification tollerances & block pattern as per design drawings	Y	N	NA																												
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<table><tr><th colspan="4">24SF1.1 BLOCK PARAWEB SCHEDULE</th></tr><tr><th>WALL HEIGHT (H)</th><th>MINIMUM EMBEDMENT DEPTH (E)</th><th>GRID LENGTH (L)*</th><th>CONNECTIONS PER BLOCK</th></tr><tr><td>8.0-10.0</td><td>0.5</td><td>9.0</td><td>4</td></tr><tr><td>6.0 - 8.0</td><td>0.5</td><td>7.0</td><td>4</td></tr><tr><td>4.0 - 6.0</td><td>0.5</td><td>5.0</td><td>4</td></tr><tr><td>2.0 - 4.0</td><td>0.5</td><td>4.0</td><td>4</td></tr><tr><td>0 - 2.0</td><td>0.5</td><td>3.0</td><td>4</td></tr></table>				24SF1.1 BLOCK PARAWEB SCHEDULE				WALL HEIGHT (H)	MINIMUM EMBEDMENT DEPTH (E)	GRID LENGTH (L)*	CONNECTIONS PER BLOCK	8.0-10.0	0.5	9.0	4	6.0 - 8.0	0.5	7.0	4	4.0 - 6.0	0.5	5.0	4	2.0 - 4.0	0.5	4.0	4	0 - 2.0	0.5	3.0	4
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150mm of fill cover is required before construction equipment can travel over the area	Y	N	NA																												
Backfill installed in max 250mm lifts	Y	N	NA																												
Proof roll completed on each layer	Y	N	NA																												
NDM testing completed Acceptance Criteria: Minimum 95% MDD Frequency: 1 per 500m3 with at least 1 test per 0.5m lift per 20m run of wall	Y	N	NA																												
Clegg testing completed (GAP65 only) Acceptance Criteria: CIV relationship to be developed by testing alongside NDM tests Frequency: 4 tests per NDM	Y	N	NA																												
Scala testing completed (Sand only) Acceptance Criteria: Minimum average value over 5 tests of 5 blows per 100mm, minimum single value of 4 blows per 100mm Frequency: 1 per 500m3, 1 test per 0.5m lift per 20m run of wall	Y	N	NA																												

**ADDITIONAL NOTES:**