INSPECTION & TEST PLAN

Inspection and Test Plan and Number	OP06_f01 Inspection & Test Plan Workbook		
Project Name	KiwiRail – North Auckland Line Recovery – CH 134.620	**Version:**	2
Date:	23/04/24	**Approved in RFI#:**	TBC
Documents / Specifications Referenced:	ENGEO NAL 136.620KM DETAILED DESIGN REPORT PRE-IFC ISSUE		

ITP#	Work Pack Element(s)	Drawing / Specification Ref.	Specification Detail Summary	Acceptance Criteria	Test Spec & Frequency	Control Type i.e. Checksheet / IANZ Records	Hold / Witness	Internal / External	PS3 Owner	Hold / Witness	PS4 Owner Sign Off
1.0 PRE-CONSTRUCTION WORKS											
1.01	Check IFC Drawings	IFC issued	Ensure latest revision is being used	Correct drawings	Prior to works, updated accordingly based on formal correspondence	Controlled IFC drawings being used – Checkpoint on QA	HOLD	Internal	JFC	REVIEW	ENGEO
1.02	Erosion and Sediment Control	ENGEO – Detailed Design Report - NAL CH 134.620km: Section 6	The contractor is responsible for protecting earthworks and erosion control measures, and must develop a site-specific Environmental Control Plan (ESCP) that KiwiRail must review before construction begins.	Contractor to ensure effective erosion and sedimentation control measures shall be installed and maintained in accordance with Auckland Council Resource Consent Requirements, and the ESCP.	Before construction begins	ESCP Documentation, Photos, Daily and Weekly Audits	HOLD	Internal	JFC	HOLD	ENGEO
1.03	Environmental and Ecological Assessment	ENGEO – Detailed Design Report - NAL CH 134.620km: Section 7	An ecologist from KiwiRail must be consulted and on-site to assess the site before and during the removal of vegetation and trees.	The contractor to collaborate with the appointed ecologist from KiwiRail and adhere to the proposed controls.	Prior to commencement of works	RFI for Clarity and record purposes	HOLD	Internal	JFC	HOLD	ENGEO
2.0 SITE CLEARANCE										**ENGINEER**	
2.01	Site Clearance	ENGEO Technical Specification – NAL 134.620km: Section 2	The Contractor must set out the working area shown on the Construction Drawings, under observation by ENGEO. The clearing extent on the plans must be agreed on-site after pegging the earthworks area. Clearing will not begin until the agreed extent is established through pegging or paint marking by the Contractor and ENGEO. Adequate silt control measures must be installed.	Agreed extent is established by the Contractor and ENGEO.	After setting out of clearing area and prior to all clearing	Written Confirmation of ENGEO's approval	HOLD	Internal	JFC	HOLD	ENGEO
3.0 EARTHWORKS										**ENGINEER**	
3.01	Protection of Earthworks and Erosion and Sediment Control	ENGEO Technical Specification – NAL 134.620km: Section 3.1	The contractor is responsible for protecting earthworks, implementing erosion and sediment control measures, and conducting surface drainage within work limits.	The KiwiRail Erosion and Sediment Control Management Plan and associated drawings must be followed for the installation and maintenance of effective erosion and sedimentation control measures.	Prior to commencement of any earthworks	Photos, Daily and Weekly audits	HOLD	Internal	JFC	REVIEW	ENGEO
3.02	Materials	ENGEO Technical Specification – NAL 134.620km: Section 3.2	The Earthworks Quality Plan must include a mass haul diagram detailing imported materials and their locations for placement. All imported fill must be certified as free of contamination at source, and reported to ENGEO and the Principal before importation.	Approval of site-won and imported granular fill material by ENGEO and or the Principal.	Prior to fill being imported to site	Material report & certification, Written Confirmation of ENGEO/Principal's approval	HOLD	Internal	JFC	HOLD	ENGEO
4.0 EARTHWORKS - EXCAVATION										**ENGINEER**	
4.01	Removal of unsuitable material	ENGEO Technical Specification – NAL	All unsuitable material removed prior to filling	Inspection and approval by ENGEO that all unsuitable material removed prior to filling	Inspection prior to filling	Photos, Written Instruction/Confirmation from ENGEO	HOLD	Internal	JFC	HOLD	ENGEO

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		134.620km: Section 4.1									
4.02	Fill Benching	ENGEO Technical Specification – NAL 134.620km: Section 4.2	To ensure proper filling, any sliding slope with a steeper slope of six horizontal to one vertical (ten degrees) must be benched before filling, while slopes shallower require scarification. ENGEO should assess cut and fill slopes for additional recommendations.	Cut and Fill Slopes to be assessed by ENGEO. Any additional recommendations to be implemented when required.	Inspection of all cut and fill slopes	Photos, Written Instruction/Confirmation from ENGEO	HOLD	Internal	JFC	HOLD	ENGEO
5.0 EARTHWORKS - FILL										**ENGINEER**	
5.01	Site-won Material	ENGEO Technical Specification – NAL 134.620km: Section 5.1	Site-won materials used as engineered fill must be free of topsoil, organic matter, and rubbish, with a maximum particle size of 100mm, and mixed or crushed efficiently.	Material compacted to achieve like for like with surrounding soils, and/or shear vanes of > SU=100 kPa and 12% air voids. Standard of compaction may be re-assessed and specified onsite by ENGEO if applicable.	Testing every layer (250mm) to be completed by ENGEO. Relaxation of testing frequency may be taken at the discretion of ENGEO	Test Results, Written Confirmation of ENGEO's approval	HOLD	Internal	JFC	WITNESS	ENGEO
5.02	Imported Hardfill for the Toe Buttress (if required)	ENGEO Technical Specification – NAL 134.620km: Section 5.2	Hardfill (imported) for the toe buttress (if required) shall comprise a graded, unweathered, durable, crushed rock product (AP65) approved by ENGEO, with a grading suitable for compaction	Hardfill product approved by ENGEO	Prior to hardfill being imported to site	Material Test Results/Certs, Confirmation of ENGEO's approval	HOLD	Internal	JFC	HOLD	ENGEO
5.03	Hardfill Testing	ENGEO Technical Specification – NAL 134.620km: Section 5.2	Hardfill placed and compacted in 200mm lifts and tested.	Hardfill compacted to 95% of the Maximum Dry Density (MDD)	One test per 500m3 of hardfill placed with not less than one test per 500mm lift of filling for each fill area	MDD Results, QA Checksheet(s)	HOLD	Internal	JFC	HOLD	ENGEO
5.04	As-builts	ENGEO Technical Specification – NAL 134.620km: Section 8	The contractor is required to provide ENGEO with as-built information for a MSQA Geotechnical Completion Report, including surveying items before filling, which should form a hold point in the construction sequence. ENGEO to receive as-built drawings for: • The depth of filling placed including all benching, undercuts, and shear keys and counterfort drainage, underfill drainage and swales.	As-built approved by ENGEO	Items to be surveyed before filling. As-builts to be provided upon completion of works	As-builts	HOLD	Internal	JFC	HOLD	ENGEO
6.0 COUNTERFORT DRAINAGE										**ENGINEER**	
6.01	Review of Drainage and Fill Materials	ENGEO Technical Specification – NAL 134.620km: Section 6.2 ENGEO – NAL 134.620km: Drawing 4	Drainage and fill materials installed within the site to the detail provided in the design drawings. -Geotextile Class C (Bidim A29 or equiv), -Perforated Subsoil Drain ((Megaflo 170, Novaflo Hi-way grade 160mm or approved equiv) -Angular no fines drainage rock (7-20mm or 40-20mm drainage)	Drainage and fill materials approved by the Geotechnical Engineer.	Prior to installation of drainage and fill materials	Material specs/certs, Written Confirmation/Approval from Geotechnical Engineer	HOLD	Internal	JFC	HOLD	ENGEO
6.02	Review of Location and Setout	ENGEO Technical Specification – NAL 134.620km: Section 6.2	Counterfort drains installed within the site in the locations provided in the design drawings	Locations agreed between the Contractor and Geotechnical Engineer	Prior to commencement of counterfort drain works	Written Confirmation/Approval from Geotechnical Engineer, Photos, QA Checksheet(s)	HOLD	Internal	JFC	HOLD	ENGEO
6.03	Installation of Counterfort Drains	ENGEO Technical Specification – NAL 134.620km: Section 6.2	Installation should be undertaken in short sections (<5m lengths) and during period of dry weather	Counterfort drains installed as per the drawings and specifications.	Post earthworks fill and Prior to filling counterfort drain	Written Confirmation/Approval from Geotechnical	HOLD	Internal	JFC	HOLD	ENGEO

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		ENGEO – NAL 134.620km: Drawing 4	The Counterfort Drainage will consist of a 500mm wide trench, 2m deep, tapering up to outlet into the reformed swale adjacent to the rail formation. The counterfort drainage should be lined with Geotextile, have a perforated subsoil drain at the base, and be backfilled with angular, no fines drainage rock. The Geotextile should fully wrap the drainage material, and the excavation should have a minimum cohesive soil cap of 0.5m thick	Installation approved by the Geotechnical Engineer		Engineer, Photos, QA Checksheet(s)					
6.04	Flushing of Drains	ENGEO Technical Specification – NAL 134.620km: Section 6.2	The invert level of outlets must be aligned with the design drawings' levels to ensure proper drainage throughout the design life.	Drains are operational and proved by the Geotechnical Engineer.	For every section of drain installed	Written Confirmation/Approval from Geotechnical Engineer, Photos, QA Checksheet(s)	HOLD	Internal	JFC	HOLD	ENGEO
6.05	Observation of Flushing Point and Outlet	ENGEO Technical Specification – NAL 134.620km: Section 6.2	Flushing point and outlet to be observed	Flushing point and outlet observed by the Geotechnical Engineer.	For every section of drain installed	Written Confirmation/Approval from Geotechnical Engineer, Photos, QA Checksheet(s)	HOLD	Internal	JFC	HOLD	ENGEO
6.06	As-builts – Surface and sub-surface drainage	ENGEO Technical Specification – NAL 134.620km: Section 8	The contractor is required to provide ENGEO with as-built information for a MSQA Geotechnical Completion Report, including surveying items before filling, which should form a hold point in the construction sequence and proof of function of the counterfort drainage. ENGEO to receive as-built drawings for: • The location and invert of all surface and sub-surface drainage	. As-built approved by ENGEO	Upon completion of works and prior to any filling	As-builts	HOLD	Internal	JFC	HOLD	ENGEO
7.0 INSPECTION AND HOLD POINTS (IN ADDITION TO WHAT HAS ALREADY BEEN LISTED ABOVE)										ENGINEER	
~~7.01~~	~~Geogrid Placement, Retaining Wall Drainage, and Keystone Placement~~		Not Required								
7.02	Drainage and Counterfort Drainage	ENGEO Technical Specification – NAL 134.620km: Section 7	ENGEO inspection of completed drainage and counterfort drainage	Approved by ENGEO	For every section of completed drainage works	Written Confirmation of ENGEO's approval, Photos, QA Checksheet(s)	HOLD	Internal	JFC	HOLD	ENGEO
7.03	Finished Surfaces	ENGEO Technical Specification – NAL 134.620km: Section 7 ENGEO – NAL 134.620km: Drawing 4	ENGEO inspection of the finished surfaces prior to revegetation (may also be required for survey purposes as required by ENGEO) Revegetation in accordance with KiwiRail Corridor Schedule (2023)	Approved by ENGEO	For every section of finished surface prior to revegetation	Written Confirmation of ENGEO's approval, Photos, QA Checksheet(s)	HOLD	Internal	JFC	HOLD	ENGEO
7.04	Hydroseeding	ENGEO Technical Specification – NAL 134.620km: Section 7	ENGEO inspection of completed hydroseeding. Hydroseeding in accordance with KiwiRail Corridor Schedule (2023)	Approved by ENGEO	For every section upon completion of hydroseeding	Written Confirmation of ENGEO's approval, Photos	HOLD	Internal	JFC	HOLD	ENGEO

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		ENGEO – NAL 134.620km: Drawing 4									
8.0 FORMATION										**ENGINEER**	
8.01	Structural Fill	N/A									
8.02	Sub-ballast	N/A									
8.03	Construction of formation (ballast)	ENGEO – NAL 134.620km: Drawing 5 CAN-01,RFI 001, RFI 028	Formation construction as per KiwiRail Standard C-ST-FO-4110 Formation and task instruction C-TI-FO-4207	KiwiRail Standard C-ST-FO-4110 Formation and task instruction C-TI-FO-4207 for construction compliance. Ballast to be 390-410mm below top of rail	For every section of formation shown on the drawings	QA Checksheet(s), Photos	HOLD	Internal	JFC	REVIEW	ENGEO
9.0 Culvert – Directional Drilled										**ENGINEER**	
9.01	Materials	ENGEO – NAL 134.620km: Drawing 8	All materials as per the design drawings	All materials comply with the drawings	Prior to use of materials on site	Dockets	HOLD	Internal	JFC	witness	ENGEO
9.01	Installation	ENGEO – NAL 134.620km: Drawing 8	Drainage works to be installed in accordance with the design drawings.	Engineer to confirm that the drainage is connected as shown on the plans.	Engineer to check prior to backfill of drainage items	Photos, QA Checksheet(s), Written Confirmation of Engineer's Approval	witness	Internal	JFC	HOLD	ENGEO
9.02	Wingwall Bedding	ENGEO – NAL 134.620km: Drawing 8	Compacted hardfill min 200mm thk	Engineer to confirm SP20 compacted to at least 95% MDD	Engineer to check every 150mm thick compacted layer	NDM Test Results, Photos, QA Checksheet(s), Written Confirmation of Engineer's Approval	HOLD	External	JFC	witness	ENGEO
9.03	As built Culvert drawings	ENGEO – NAL 134.620km: Drawing 8	As built drawings to be provided by the contractor to detail the final construction of the works including any amendments established during the construction	Engineer's & KiwiRail acceptance	At ballast handover & at completion	KR documents: M37c & As-Built Requirements for Culvert Renewals 441048-03-CC-COM-QA-NAL-CU	Witness	Internal	JFC	HOLD	ENGEO
10..0 POST CONSTRUCTION										**ENGINEER**	
10.01	Revegetation		The slope will be revegetated using native hydroseeding, native shrub planting, or a combination of both, approved by a KiwiRail environmental scientist and ecologist.	Revegetation planting comply with KiwiRail approved corridor planting schedule 2023.	Shrubs to be approved by KiwiRail environmental scientist and ecologist before planting or seeding.	List of native shrub, Written Confirmation from KiwiRail Environmental Specialist	witness	Internal	JFC	HOLD	ENGEO
10.02	As-builts	ENGEO Technical Specification – NAL 134.620km: Section 8	Following the construction, ENGEO should be provided with as built documentation to append their MSQA documentation. ENGEO provided with as built documentation of the: -monitoring fence -drainage -rip rap to append to our MSQA documentation.	As-built approved by ENGEO & KiwiRail (subgrade, excavations, pipe inverts, wingwalls, rip rap excavations & extents, drainage string (culvert, swales etc.) completion levels	At ballast handover & at completion	KR documents: M37c & As-Built Requirements for Culvert Renewals 441048-03-CC-COM-QA-NAL-CU	Witness	Internal	JFC	HOLD	ENGEO
10.03	As built Culvert drawings	ENGEO – NAL 134.620km: Drawing 8	As built drawings to be provided by the contractor to detail the final construction of the remedial works including any amendments established during the construction	Engineer's & KiwiRail acceptance	At ballast handover & at completion	KR documents: M37c & As-Built Requirements for Culvert Renewals 441048-03-CC-COM-QA-NAL-CU	Witness	Internal	JFC	HOLD	ENGEO

Sub-contractor ITPs (Refer to OP06_f09 ITP Index for Subcontractors)

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Sub Activity 1 (INSERT QA SHEET NAME)							(ENTER SUBCONTRACTOR)			ENGINEER	
30											
31											
32											
33											
34											
Sub Activity 2 (INSERT QA SHEET NAME)							(ENTER SUBCONTRACTOR)			ENGINEER	
35											
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ITP Induction Sign On

ITP Induction Sign-on		
Name	Date	Signature