
Site Specific Environmental Management Plan

– Peka Peka to Ōtaki Project

NZ1: Construction of Bridge's 2 and 3

FCCL-EV-MPN-0015

Revision C – November 2017

Contents

Authorisation and Revision Record	iv
Certification Record.....	iv
1 Introduction.....	1
1.1 Location of Works	2
1.2 Description of Works	2
1.3 Programme	3
1.4 SSEMP Changes.....	4
2 Plan implementation.....	4
2.1 Responsibilities	4
3 Environmental Considerations.....	8
3.1 Iwi.....	8
3.2 Archaeology	8
3.2.1 Accidental Discovery Protocols.....	9
3.2.2 Discovery of Suspected Archaeological Features or Deposits	9
3.2.3 Discovery of Koiwi Tangata (Human Remains)	9
3.2.4 Discovery of Taonga.....	10
3.2.5 Specific Tikanga Maori Protocols	10
3.3 Ecology.....	11
3.3.1 Terrestrial.....	11
3.3.2 Aquatic	11
3.4 Noise and Vibration	11
3.5 Air Quality	11
3.6 Contaminated Land.....	12
4 Site Management.....	12
4.1 Construction Activities.....	12
4.1.1 Stage One: East of the existing rail line.....	12

4.1.2	Stage Two: West of existing railway	12
4.1.3	Stage Three: Construction of the rail embankment through Pare-o-Matangi Reserve ...	13
4.1.4	Stage Four: Construction of Bridge's 2 and 3.....	13
4.2	Access.....	15
4.3	Site Preparation	16
4.4	Construction Plant	16
4.5	Waste	17
4.5.1	Sewage	17
4.6	Materials storage.....	17
4.7	Water supply.....	18
4.8	Pare-o-Matangi Reserve	18
5	Earthworks.....	18
5.1	Erosion and sediment control.....	18
5.1.1	Stage One	18
5.1.2	Stage Two.....	19
5.1.3	Stage Three	19
5.1.4	Stage Four	20
5.2	Re-vegetation.....	20
5.3	Quarrying	21
6	Ecological requirements	21
6.1	General requirements.....	21
6.2	Pipit	21
6.3	Ecological Monitoring	22
6.4	Aquatic Species Relocation	22
7	Streamworks.....	22
8	Stormwater.....	22
8.1	Permanent Culverts	22
8.2	Temporary Culverts.....	22

9	Air Quality	23
9.1	Transport of materials	24
10	noise and Vibration	24
10.1	Pre-condition Building Surveys	25
11	Traffic	26
	Appendix A – SSEMP authors	26
	Appendix B – Consultation Record	27
	appendix C – Drawings	28
	Works Methodology Stage 1-4	29
	Environmental Constraints Drawing	30
	General Arrangement Construction Drawings (reference only for future general layout)	31
	Bridge Construction Drawings	32
	Appendix D – Programme	33
	Appendix E – Culvert Summary	34
	Appendix F – Settlement Monitoring Locations	35
	Appendix G – Risk Register	36
	Appendix H – Site Specific Traffic Management Plan	37

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Certification Record


Revision	Action	Name	Position	Date	Signature
	Approved by:	<i>Richard Perry Project Leader</i>			
	On behalf of GWRC:			24/11/17	
	Approved by:				
	On behalf of KCDC:				

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	Approved by:				
	On behalf of GWRC:				
	Approved by:	Vijay Soma	Acting Manager Resource consents + compliance	24/11/17	
	On behalf of KCDC:				

1 INTRODUCTION

This Site Specific Environmental Management Plan (SSEMP) provides the necessary information to demonstrate how the project team plan to avoid or mitigate potential adverse environmental effects relating to construction of the Peka Peka to Ōtaki Expressway.

This document covers the area of works between chainage 1400 – 2000 and is the first of three SSEMPs to cover this area of the site. The general SSEMP sequencing will be as follows:


SSEMP NZ1	SSEMP NZ2	SSEMP PW4
Construction of Bridge's 2 and 3 		
Enabling earthworks to allow access to Bridge 2 and 3		
Construction of the new railway embankment		
Installation of culverts beneath Bridge 2 and the new railway embankment		
	Complete ecological requirements within the Ōtaki Railway Wetland (i.e. fish relocation methods).	
	Bulk earthworks along the main expressway alignment including installation of stormwater lines	
	Final earthworks to tie into Bridge 2 and 3, as well as rail realignment upon completion of the bridges	
		Final landscaping, revegetation and pavement construction along the main alignment.

Table 1: Overview of the SSEMP sequencing

This SSEMP reflects the requirements of the Construction Environmental Management Plan (CEMP) and its appendices, and is intended to be utilised by the construction team to clearly identify any site specific environmental requirements that must be adhered to prior to, and during works. A suite of over-arching environmental management plans have been drawn from to inform the contents of this SSEMP. All works will be carried out in general accordance with these management plans.

Works are not to commence on site until certification of this SSEMP has been confirmed in writing by Kapiti Coast District Council (KCDC) and Greater Wellington Regional Council (GWRC).

1.1 Location of Works

Works will take place between Chainage 1400 – 2000, with particular focus on construction of Bridge 2 and 3 and construction of the new railway embankment through this area.

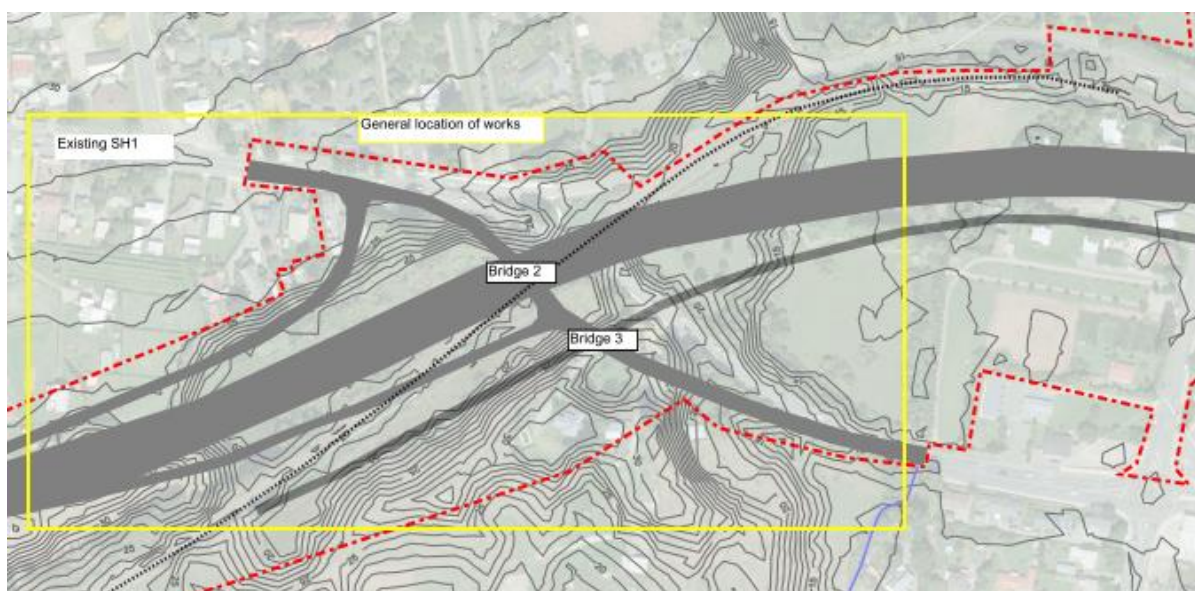


Figure 1: General location of works covered under this SSEMP (outlined in yellow)

1.2 Description of Works

Construction is due to commence on the North Ōtaki Main Road Underpass (Bridge 2) and North Ōtaki Rail Overpass (Bridge 3) late November 2017. These two bridges are the first of the PP20 structures to get underway with the intention that the new bridges become open to traffic in late 2018. This will allow for the final realignment of North Island Main Trunk Railway and subsequent final Expressway alignment construction.

Works covered under this SSEMP reflect the early phase of works that the project is currently in and does not include construction of the final expressway embankment to final design. Works at this stage are restricted to the following:

- Stage One:
 - Enabling earthworks to provide access to Bridge 2 and an on-site source of sand at the Northern end.
 - Peat undercut and sand backfill within the southbound off-ramp footprint, and along the haul road between the Northern Dune and Bridge 2.
 - Extension of the existing stormwater pipe using >600dia sized pipe to run beneath the haul road and discharge to the wetland.
 - Peat undercut and sand backfill of the Bridge 2 MSE wall footprint including installation of Permanent Culvert 12 in the dry.
- Stage Two:
 - Enabling earthworks west of the existing railway alignment including peat undercut and sand backfill using an on-site source of sand.
 - Construction of the new railway embankment off-line of the existing rail corridor.
- Stage Three:
 - Construction of the new railway embankment through Pare-o-Matangi Reserve (partially)
- Stage Four:
 - Construction of Bridge 2
 - Construction of Bridge 3

Note that although works will commence sequentially as listed above, all four stages will overlap depending on works progress and availability of resources.

1.3 Programme

The expected programme for the activities covered by this SSEMP are as follows:

Activity	Timing	Duration
Stage One	November 2017	Approximately 2 months
Stage Two	November 2017	Approximately 3 months
Stage Three	January 2018	Approximately 1 month
Stage Four	December 2017	Approximately 8 months

A detailed programme can be found in Appendix D.

1.4 SSEMP Changes

In accordance with resource consent condition G.21A, amendments may be made to this SSEMP in the form of a 'minor change' which is required to be submitted to the Manger for information at least 2 working days prior to implementation of that change, or a 'major change' which is required to be submitted to the Manager for certification at least 5 working days prior to implementation of that change. Minor changes associated with this SSEMP are defined as follows:

- Stabilisation following minor ground disturbance.
- Use of additional silt control provided that the controls can be installed in accordance with the project Erosion and Sediment Control Plan (ESCP).
- Ecological works provided they can occur in accordance with the Ecological Management Plan (EMP).
- Addition of stormwater structures if works can be carried out in a dry environment.
- Any additional changes as agreed by the Manager.

2 PLAN IMPLEMENTATION

2.1 Responsibilities

The following provides a summary of responsibilities relevant to the planning and implementation of this SSEMP.

Role	Person	Contact Details	Responsibilities
Construction Manager	Steve Findlay	stevef@fcc.co.nz 029 770 3128	<ul style="list-style-type: none"> • Ensures there is a system in place so that construction works do not proceed until required environmental sign-offs are completed. • Overviews systems and processes to ensure consent requirements are captured for construction works. • Ensures adequate resources are provided to ensure environmental issues are appropriately managed. • Reviews environmental incidents and complaints with the Environmental Manager and acts to address issues where needed. • Reviews and monitors construction work methods to ensure compliance with RMA conditions

Environmental Manager	Alice Naylor	A.Naylor@Higgins.co.nz 027 297 6055	<ul style="list-style-type: none"> • Develops, implements and reviews environmental management systems and environmental management plans. • Coordinates all environmental auditing functions and ensures relevant records are maintained. • Responds to and investigates all environmental complaints, issues or incidents. • Coordinates the SSEMP implementation process and pre-works requirements to ensure that environmental requirements are adhered to. • Provides training and briefings to site staff to ensure that there is sufficient knowledge of environmental requirements in the field. • Acts as the primary point of communication between regulatory bodies and the project. • Coordinates a team of experts in specialist disciplines such as contaminated land, ecology, groundwater, noise and vibration. • Communicates environmentally sensitive areas to the construction team.
Environmental Coordinator	Sevasti Hartley	sevastih@fcc.co.nz 0278078400	<ul style="list-style-type: none"> • Supports the Environmental Manager and provides leadership to ensure all staff comply with environmental management systems. • Provides support in the formation of SSEMPs. • Undertakes as-built of environmental controls. • Undertakes regular site inspections and audits. • Coordinates all site monitoring including but not limited to groundwater, water quality, ecological, dust, noise, and vibration monitoring. • Manages maintenance and monitoring of Chemical Treatment Systems (if used). • Ensures spill kits are available and stocked and provides training on equipment use. • Conducts regular site inspections of erosion and sediment control devices

			<p>and co-ordinates maintenance where necessary.</p> <ul style="list-style-type: none"> • Monitors site controls during rain storms. • Trains staff in site specific environmental procedures.
Stakeholder & Communication s Manager	Ed Breese	ebreese@tonkintaylor.co.nz 021 333 726	<ul style="list-style-type: none"> • Organises, co-ordinates and facilitates engagement with affected property holders and community prior to and during construction. • Works in partnership with Environmental Manager on engagement and construction activities in accordance with RMA conditions
Site Superintendent / Supervisors / Foreman	Simon Fifield	SimonF@fcc.co.nz 027 209 2295	<ul style="list-style-type: none"> • Provides leadership to the site construction team. • Ensures environmental controls including erosion and sediment control works are protected and maintained on a day to day basis. • Ensures that the SSEMPs and Archaeological Authority requirements are implemented appropriately by the construction team. • Maintains contactability 24/7 during construction and has authority to initiate immediate response actions. • Reports all environmental incidents, compliance issues and complaints to the Environmental Manager. • Reviews the need to use a water cart or sprinklers to control dust.
Project Engineers	Richard Rakovics (Civil) Craig Service (Structural)	RichardR@fcc.co.nz CraigS@fcc.co.nz	<ul style="list-style-type: none"> • Responsible for ensuring environmental controls and erosion and sediment control works are installed and modified as appropriate for each stage of construction. • Develop, implements and monitors construction methods and environmental protection measures to ensure compliance with the SSEMPs. • Demonstrate understanding of major environmental and community issues and environmentally sensitive areas. • Coordinate environmental interfaces with subcontractors and suppliers.

			<ul style="list-style-type: none"> • Reports all environmental incidents, compliance issues and complaints to the Environmental Manager.
Specialist support (contaminated land, ecology, noise and vibration)	<p>Liz Deakin (Terrestrial Ecologist)</p> <p>Dean Miller (Principal Ecologist)</p> <p>Kathryn Longstaff (Avian Ecologist)</p> <p>Genevieve Smith – Contaminated land</p> <p>Brendon Shanks – Noise and Vibration</p>	<p>LDeakin@tonkintaylor.co.nz 027 568 1995</p> <p>DCMiller@tonkintaylor.co.nz 021542396</p> <p>KLongstaff@tonkintaylor.co.nz</p> <p>Genevieve.Smith@beca.co.nz</p> <p>Brendon.Shanks@marshallday.co.nz</p>	<ul style="list-style-type: none"> • Provide expert advice to the Environmental Manager and Environmental Coordinator regarding specific site requirements. • Submits reports to the Environmental Manager to fulfil requirements of consents relevant to their field. • Briefs the construction team of site specific requirements for environmentally 'sensitive areas'.
Iwi	Te Waari Carkeek (Ngā Hapū o Ōtaki)	TeWaariC@fcc.co.nz	<ul style="list-style-type: none"> • Provide input into project documentation such as management plans, design processes, planning documents. • Reviews permits to work and coordinates the level of involvement of kaitiaki in site activities

			<ul style="list-style-type: none"> • Coordinates all aspects of iwi monitoring. • Key point of contact for Ngā Hapū o Ōtaki.
Iwi	Muaupoko Tribal Authority	TBC	<ul style="list-style-type: none"> • Point of contact for any archaeological discoveries in accordance with the agreed accidental discovery protocols and MTA agreement.

3 ENVIRONMENTAL CONSIDERATIONS

The following section identifies key environmental aspects that need to be considered during planning and commencement of works on site. In some instances, these have been further defined in section 4 of the document.

3.1 Iwi

A Kaiarahi (iwi guide / leader) has now been appointed which will be the key point of contact and coordination for Ngā Hapū o Ōtaki. The Kaiarahi will be involved in the design process, construction supervision and environmental monitoring. The Kaiarahi will be supported by the Kaitiaki (guardians) who provide support in supervision and monitoring activities and provision of specialist advice. Ngā Hapū o Ōtaki will be informed of all works on site and invited to be present for all works, particularly in regards to initial topsoil stripping or ecological surveys required prior to physical works commencement.

Contact must also be maintained with Muaupoko Tribal Authority (MTA) in accordance with MTA agreement and confirmed accidental discovery protocols, summarised below in section 3.2.

3.2 Archaeology

All works under this SSEMP will be carried out in accordance with the approved archaeological authority and the Archaeological Site Management Plan. The Archaeological Site Management Plan outlines high, medium, and low risk archaeological areas across the project footprint. There are two 'high risk archaeological sites' that will be impacted during stage one and stage four works under this SSEMP. This high risk sites are outlined on the 'Environmental Constraints Drawing' in Appendix C. In accordance with the Archaeological Site Management Plan, high-risk archaeological areas require further investigation prior to works commencing in these areas.

All other areas are deemed to be low-risk areas and will be covered by an 'Accidental Discovery Protocols'. The accidental discovery protocols is outlined in the Archaeological Site Management Plan and must be adhered to in instances where subsurface archaeological remains, koiwi tangata, or taonga are exposed during construction.

The agreed protocols are summarised as follows:

3.2.1 Accidental Discovery Protocols

The protocols for accidental archaeological discovery set out below will be followed if subsurface archaeological remains, koiwi tangata (human remains) or taonga are exposed during construction in areas that are not being monitored by an archaeologist or when archaeologists are not present on site.

Information provided below outlines procedures to be followed in the case of suspected unrecorded archaeological sites being located during the course of work.

3.2.2 Discovery of Suspected Archaeological Features or Deposits

If suspected archaeological remains are exposed in the course of works, the following procedure will be implemented:

1. Contractors shall cease all work within the vicinity of the suspected archaeological site, and immediately notify the Site Project Manager.
2. The area of the suspected archaeological deposit or feature is to be made secure, ensuring that the area (and any objects contained within) remains undisturbed and meets health and safety requirements.
3. The Project Manager will arrange for the Project Archaeologist to visit the site, to confirm the nature of the archaeological site, and to define the extent of the deposit or feature.
4. Following confirmation of the site as archaeological, the Project Manager will notify the Regional Archaeologist HNZPT, The Transport Agency, Nga Hapū o Ōtaki and M.T.A representatives and, if appropriate, district and city council representatives.
5. The archaeological remains will be investigated and recorded in accordance with archaeological best practice, and in line with the legal conditions of any authority granted by HNZPT.
6. Works can resume once the Project Archaeologist confirms that the required investigation and recording are complete and Nga Hapū o Ōtaki and M.T.A representatives and HNZPT give their agreement.

3.2.3 Discovery of Koiwi Tangata (Human Remains)

If suspected human remains are identified, the following protocol will be adopted:

1. Earthworks shall cease within **20 meters** of the find while an appropriately qualified archaeologist is consulted to establish whether the bone is human.
2. The area of the site containing koiwi will be secured, ensuring that the area (and any objects contained within) remains undisturbed and meets health and safety requirements.

3. If it is determined that bone is human, earthworks will not resume in the immediate vicinity (as determined by the Project Archaeologist) until HNZPT, Nga Hapū o Ōtaki and M.T.A representatives, the New Zealand Police and district council representatives have been notified.
4. Nga Hapū o Ōtaki and M.T.A representatives will be given the opportunity to conduct karakia in association with appropriate tikanga Māori prior to the removal of koiwi for reburial.
5. If Nga Hapū o Ōtaki and M.T.A representatives so request, koiwi may be further analysed by a specialist osteo-archaeologist prior to reburial.
6. Work within the area can recommence as soon as the remains have been removed from site, and with the agreement of all relevant agencies.

3.2.4 Discovery of Taonga

Maori artefacts such as carvings, stone adzes, and greenstone are considered to be taonga (treasures). These objects are identified as taonga tuturu in the Protected Objects Act 1975. Taonga may be discovered in isolated contexts, but are generally found within archaeological sites, modification of which is subject to the provisions of the HNZPT Act.

If taonga are discovered, the procedure established for the discovery of archaeological sites (as detailed above) must be followed, and the following procedure will apply to the taonga itself:

1. The area of the site containing the taonga will be secured in such a way that protects the taonga from further disturbance or damage.
2. The archaeologist will inform HNZPT and Nga Hapū o Ōtaki and M.T.A representatives so that appropriate actions can be determined, and appropriate tikanga protocols to be undertaken.
3. If the object is identified as taonga tuturu the Project Archaeologist will notify the Ministry for Culture and Heritage of the finding, as required under the Protected Objects Act 1975.
4. The Ministry for Culture and Heritage, in consultation with Nga Hapū o Ōtaki and M.T.A representatives, will decide on custodianship of the taonga. If the taonga requires conservation treatment this can be carried out by the Archaeological Conservation Laboratory, University of Auckland.

3.2.5 Specific Tikanga Maori Protocols

1. Nga Hapū o Ōtaki and M.T.A shall be informed **48 hours** before the start and finish of the archaeological work.
2. Any alterations to the Archaeological Site Management Plan will be discussed with Nga Hapū o Ōtaki and M.T.A.
3. Access for Nga Hapū o Ōtaki and M.T.A shall be enabled in order to undertake tikanga Maori protocols consistent with any requirements of site safety.

4. Nga Hapū o Ōtaki and M.T.A shall be provided with a copy of all reports completed as a result of the archaeological work associated with this authority(s) and be given an opportunity to discuss it with the archaeologist if required.
5. Nga Hapū o Ōtaki will notify other iwi parties of any archaeological finds (e.g. taonga or kōiwi tangata) and subsequent ceremonies as deemed appropriate by Nga Hapū o Ōtaki and M.T.A.

3.3 Ecology

3.3.1 Terrestrial

Chainage 1000 – 1450 is identified in the Ecological Management Plan (EMP) as requiring bird survey to be carried out prior to works. This bird survey (specifically pipit survey) will be completed in accordance with SSEMP PW1 'Vegetation Clearance and enabling Works' and should not be required prior to works commencing under this SSEMP.

In the event that pipit surveys *are not* completed prior to works carried out under this SSEMP (i.e. prior to excavation of the 'northern dune'), then the procedure outlined in Section 6.2 below will be followed.

3.3.2 Aquatic

During enabling works activities, works will be separated from the Ōtaki Railway Wetland at all times with clear delineation between the wetland and the works site by use of sediment control devices. Works within the wetland itself will be outlined at a later date in accordance with the next SSEMP for this area.

3.4 Noise and Vibration

The Construction Noise and Vibration Management Plan (CNVMP) identifies the noise and vibration performance standards that must, where practicable, be complied with. It also sets out best practicable options for noise and vibration management for the Project, including mitigation measures, monitoring requirements, and communication and complaint procedures. All works under this SSEMP will be carried out in general accordance with the CNVMP. Site specific information relevant to noise and vibration associated with the activities outlined in this SSEMP are further defined in Section 10.

3.5 Air Quality

If not managed effectively, there is potential for works to generate dust discharge, particularly during initial disturbance of the southern and northern dune sands. The Construction Air Quality Management Plan (CAQMP) outlines methods to be used to prevent dust and odour nuisance during construction from the site. All works under this SSEMP will be carried out in general accordance with the CAQMP. Further information in regards to site specific mitigation measures have been included in Section 9 below.

3.6 Contaminated Land

The Bulk Earthworks Contaminated Land Management Plan (BECLMP) provides a framework and general procedures for the management of contaminated soil and other contaminated materials/structures potentially present in ground that may be disturbed or require removal to complete the Project. A number of potentially contaminated sites located within the Project corridor were identified during the desk based Phase 1 Contaminated Land Assessment. Potentially contaminated land sites have not been identified within the footprint of works to be carried out under this SSEMP and therefore no further information is required to be provided in relation to management of contaminated land.

4 SITE MANAGEMENT

4.1 Construction Activities

4.1.1 Stage One: East of the existing rail line

- Access from SH1 (east of alignment) as shown on the attached drawings in Appendix C.
- Strip topsoil from within the off-ramp footprint, taking care not to encroach on the Ōtaki Railway Wetland. The wetland extent will be clearly marked on site following vegetation clearance to be carried out in accordance with SSEMP PW1 'Vegetation Clearance and Enabling Works'.
- Construct dirty water diversion bunds along edge of the Ōtaki Railway Wetland. Refer to section 5.1 for erosion and sediment control details.
- Extend the existing stormwater discharge pipe (currently conveying overflow stormwater from SH1) to run beneath the works footprint, tying the diversion bunds into the outlet to allow clean water to flow into the Ōtaki Railway Wetland. Although this is not considered to be a 'culvert', sizing of this pipe extension will be no less than 600 diameter to align with temporary culvert requirements specified in condition WS.12. Refer to section 8.2 for further details and contingency measures relating to this pipe extension.
- Excavate sand from the 'Northern Dune' and cart south to be used for Bridge 2.
- Undercut minor areas of soft peat material and backfill with sand if required to allow safe passage of heavy vehicles between the Northern Dune and Bridge 2 location.
- Undercut MSE footprint at Bridge 2, followed by sand backfill.
- Construct Permanent Culvert 12 in the dry.

4.1.2 Stage Two: West of existing railway

- Access via SH1 (west of alignment) as shown on the attached drawings in Appendix C.
- Undercut peat west of existing rail corridor.
- Cut sand from the 'Southern Dune' and use to shape rail embankment from north tie-in point to the existing State highway.
- Construct permanent Culvert (5DMH-6C to SDMH-6), beneath the new rail embankment.

4.1.3 Stage Three: Construction of the rail embankment through Pare-o-Matangi Reserve

- Construction of the railway embankment between the existing State Highway and the Mangapouri Stream at chainage 2000.
- Sand will be sourced from the 'Southern Dune'.

4.1.4 Stage Four: Construction of Bridge's 2 and 3

4.1.4.1 Bridge enabling works

- Establish site sheds and amenities including site containers and portaloos.
- Establish localised temporary construction fencing.

4.1.4.2 MSE Walls.

The sequencing for the Reinforced Earth Wall (RE wall) abutment construction on the western side of the railway tracks will be Bridge 2 east and Bridge 3 west abutments simultaneously, followed by Bridge 3 east abutment. This is so the works can proceed from the railway track out and allow the new rail alignment to start without interaction with the RE Wall construction.

The construction sequence for Bridge 2 Western abutment and both of Bridge 3 MSE walls are as follows:

- Construct RE base layer
- Excavate for footing beam
- Construct footing beam
- Construct RE Wall layers and any earthworks that ties into RE wall. All RE panels to be delivered progressively. Note that the RE wall will be constructed up to the underside of the abutment beam at which point the abutment beam will be constructed.

The construction sequence for Bridge 2 western abutment and temporary SH1 retaining wall is as follows.

- Establish site delineation, sight screens and any temporary traffic control along footpath and existing SH1.
- Clear vegetation around BR02 Eastern abutment and adjacent to SH1 in preparation for temporary retaining wall construction.
- Construct access track for plant to access temporary retaining wall.
- Construct construction pads for retaining wall construction.
- Carry out shotcrete and soil nailing for temporary retaining wall. Note that the wall will be constructed progressively and top down. The process of soil nailing and shotcrete will repeat for every 1.5m at which point the excavation will be cut down construction pad re-established for the next shotcrete operation.
- With the retaining wall completed excavate and replace any not suitable materials at the base of the MSE Wall.

- Construct RE base layer
- Excavate for footing beam
- Construct footing beam
- Construct RE Wall layers and any earthworks that ties into the RE wall.

Note that the RE wall will be constructed up to the underside of the abutment beam at which point the abutment beam will be constructed.

4.1.4.3 Construct abutment beams

- The sequence for the abutment beams will follow directly on from the MSE wall.
- Erect abutment beam edge protection
- Prep and Pour blinding. Note: The blinding shall be chute placed from the adjoining access tracks formed as part of the MSE Wall construction and not pumps.
- Fix reinforcing
- Form
- Pour
- Cure
- Strip
- Prep abutment beam for bearing and beam placement.

4.1.4.4 Beams and bearings placement

It is anticipated that due to the sequencing of both Bridge 2 and 3 that the beams will be installed on Bridge 3 prior to Bridge 2 and that the timeframe between Bridge 2 and Bridge 3 is such that the crane will not need to be re-established.

Note: The sequence of install for Bridge 2 will be governed by any track movements and rail authority approvals.

- Construct crane construction pads
- Mobilise the crane to site
- Deliver the first beam for Bridge 3 to site
- Dress the first beam with walkways and any other required items such as bridge services
- Install and deliver Bridge 3 beams
- Repeat the above for the installation of beams on Bridge 2

4.1.4.5 Deck construction

- Seal deck using timber, ply and sealant for boats and between the flanges of the tees.
- Erect deck edge form and stop ends ready for reinforcing.
- Fix reinforcing to height
- Establish screed rails
- Setup pump and associated secondary environmental and/or hazard controls where required, such as polythene over streams or catch nets over walkways.
- Place and finish concrete

- Setup curing system which will consist of hessian and black plastic with a water feed on trickle. Water runoff will be contained on site with a contingency option to dispose of material off-site via sucker truck if required.
- Remove curing system and dispose of accordingly.
- Remove walkways off beams and install temporary edge protection ready for installation of the precast barriers.

4.1.4.6 Continuation of MSE wall, settlement slab construction and abutment backfill

Note that across all the abutments this operation needs to occur at the same time, i.e a layer on Bridge 2 east abutment followed by a layer on Bridge 2 west abutment, this is to prevent uneven loads between the abutments.

- Form, reinforce and pour the insitu stitch between the abutment and MSE wall panels
- Complete the final layers of the RE wall.
- Construct Settlement slab
- Setup curing system which will consist of hessian and black plastic with a water feed on trickle. Water runoff will be contained on site with a contingency option to dispose of material off-site via sucker truck if required.
- Remove curing system and dispose of accordingly
- Backfill to required level

4.1.4.7 Barrier construction

Note: The sequence of install for Bridge 2 will be governed by any track movements and rail authority approvals.

- Establish crane on abutment and atop MSE wall for installation of precast barriers.
- Deliver precast units to site and install.
- Install and grout rail atop of precast barrier.

4.2 Access

Two access/egress points will be utilised for these works from SH1. These have both been identified on the drawings in Appendix C.

The access/egress points will be stabilised using clean aggregate or sealed to avoid any construction related material entering SH1.

Details/configurations related to the individual access/egress point will be covered in Appendix H as part of the Site Specific Traffic Management Plans (SSTMPs).

4.3 Site Preparation

As part of the site preparation and establishment works the following mitigation measures will be implemented to avoid or minimise adverse environmental effects:

- Prior to commencement of works, safety fencing and clear signage will be erected to ensure the safety of the public. Immediate neighbours and the general public will be notified of each stage of works in accordance with requirements set out in the Stakeholder and Community Management Plan (SCMP).
- At least one month prior to works, a pre-construction settlement survey must be carried out in accordance with D.C 44 and 45. Appendix F outlines the confirmed settlement marker locations which require pre-construction monitoring.
- Sensitive areas in regards to ecology, archaeology, and residential / commercial receivers in close proximity to works will be clearly marked on drawings (attached) and provided to the relevant contractor(s) prior to commencement of works.
- Site specific information, including environmental constraints and requirements, will be discussed at the relevant pre-construction site meetings with input from specialists as required.
- Prior to works commencing in each area, the project surveyors will use GPS to identify the extent of works. The works area will be clearly marked-out with regular input from the survey team throughout works as required.
- Areas identified as 'retained vegetation' as per the approved vegetation retention plans will be clearly delineated using physical markers on site.
- Environmental requirements for any given area will be noted on each project "Permit to Work'. These permits are required for any activity on site and must be in place and signed off by the environmental team prior to works commencement.

4.4 Construction Plant

The plant items to be used to undertake each of the activities generally as follows:

Civil works

- 6 – 20T excavators
- Dumpers
- Water carts as required
- Light vehicles

Bridge Works

- 350T crane x 2
- 20T excavator
- Concrete pump
- 30T crane
- Franner crane

- Merlo
- Hiab
- Light vehicles
- Drill rig (soil nails)
- Trucks

All plant will require to be inspected prior to start of works and during construction activities at regular intervals. Unwanted vegetation, seeds or contaminants will be cleared prior to plant entering the site to avoid the introduction or spread of weeds or pest species.

Plant inspections will be recorded on daily plant inspection forms to demonstrate that all plant used on this project are in good working order and have been cleared of unwanted weeds and pest species. Any faulty equipment will be stood down until the necessary repairs are carried out and the given plant is fit for purpose.

Spill control kits will be available on site at the site compound locations and areas where heavy machinery is working (as a minimum) to assist with the clean-up in the event of any spillages. Refuelling activities will take place using a mini-tanker away from watercourses to prevent additional risk of spillage to water.

4.5 Waste

Resource efficiency and waste management is discussed in Section 3.12 of the CEMP. Waste units will generally be located at the two project site establishment locations at Bridge Lodge and Rahui Road, and will be located such that they do not cause issues in regards to odour for adjacent properties. The project is working towards a Greenroads Bronze certification and therefore resource efficiency and effective waste management practices will be integrated into planning for all works, whether at the site establishment locations, in the offices, or across the wider site.

4.5.1 Sewage

Portaloos will be located at the bridge sites and will be maintained by the sub-contractor to ensure that each site is maintained in a tidy state. Potaloos will be located away from residential properties to ensure that odour does not cause a nuisance to neighbours, and away from the wetland to ensure risk of pollution is minimised.

4.6 Materials storage

Storage of project materials, including fuels and lubricant will also require careful management. Section 3.11 of the CEMP outlines procedures for storing fuels and lubricants on site and this will be followed at all times. Only materials necessary for the project will be stored on site in order to keep materials to a minimum.

4.7 Water supply

Water may be required to prevent dust discharge from the site during cut to fill works. Water required for these works will be collected from off-site.

4.8 Pare-o-Matangi Reserve

Pare-o-Matangi Reserve is an important open space within ōtaki. Much of the existing reserve will be removed as a result of construction of the expressway and railway realignment eventually, but at this stage, only the new rail footprint will be impacted.

Pedestrian access will be carefully managed to ensure that the public remain safe at all times during the works and after working hours. Temporary safety fencing and clear signage will be utilised to delineate the site. Consultation with Keep ōtaki Beautiful, KCDC, and the local community will be a fundamental part to ensuring effective management of works within this area. Identified existing vegetation to be retained within the reserve will be clearly marked out on site to avoid any unnecessary vegetation removal.

5 EARTHWORKS

Note: Hold point – earthworks associated with 'Stage Three' works outlined below can only commence following certification by the Manger GWRC, of the telemetered instream NTU monitoring methods and locations for the Mangapouri Stream in a revised EMP and ESCP.

Earthworks will primarily be localised around construction of the new railway embankment and the two bridge sites. The main source of sand for works east of the existing railway will be approximately 10,000m³ from the 'Northern Dune' as indicated on the attached drawings in Appendix C. Approximately 30,000m³ of fill material for works on the western side of the railway will be sourced from the existing 'Southern Dune' and used also to form the new railway embankment through to approximate Chainage 2000.

5.1 Erosion and sediment control

Erosion and sediment control will typically be implemented in accordance with the project Erosion and Sediment Control Plan (ESCP).

5.1.1 Stage One

Erosion and sediment controls will be required along the eastern side of the existing ōtaki Railway Wetland to protect the wetland during works. Works are not to take place within the wetland under this SSEMP. The wetland will be protected from any impacts including sediment discharge from the work site.

Specifically, the following will be implemented:

- Topsoil will be stripped from within the general footprint of the off-ramp location (from SH1 extending to the northern dune) and used to form dirty water diversion bunds (550mm high) along the eastern and northern edges of the Ōtaki Railway Wetland (refer to Appendix C).
- Dirty water diversion bunds will be sized in accordance with the ESCP Appendix B calculations summarised in table 1 below. A height of 550mm has been chosen to cater for the 5% AEP based on two different catchment sizes from the east and the north, neither of which exceed 1ha.
- A floating T-Bar decant will be constructed at the low point with a stabilised emergency spillway in accordance with the ESCP to ensure that site runoff is sufficiently treated prior to discharge. The exact location of the floating T-Bar will be determined on site once initial clearance works are complete. Any decants will be held up using a pulley system or suitable alternative as the default position and be lowered as required following sufficient treatment. Any lowering of decants will be carried out under an approved permit to pump as specified in the project ESCP, and as a minimum must adhere to the following general conditions:
 - The discharge must not increase the downstream water quality by >20% (compared to upstream levels if applicable).
 - Water pH must be between 5.5 and 9 (particularly relevant if working with concrete).
 - The discharge does not cause obvious visual discolouration of the downstream environment beyond 'reasonable mixing' (deemed as 30m from initial discharge point unless otherwise specified due to access restrictions).
 - Permit to pump documentation must be available for inspection by GWRC upon request.
- Entry/egress points will be stabilised as required with aggregate and maintained in a clean state to ensure that dirt is not dragged onto SH1 from the work site.'

5.1.2 Stage Two

- During enabling works to the west of the existing railway, additional controls are not required due to the >1 elevation of the existing rail embankment which will not be altered under this SSEMP. This embankment will provide natural impoundment to avoid any runoff from the area.

5.1.3 Stage Three

- During formation of the new rail embankment within the Pare-o-Matangi Reserve, a dirty water diversion bund, fitted with a T-Bar decant at the low point, will be constructed along the toe of the fill embankment to ensure that the Mangapouri Stream (Ch.2000) is protected at all times.
- Any decants will be held up using a pulley system or suitable alternative as the default position and be lowered as required following sufficient treatment. Any lowering of decants will be carried out under an approved permit to pump as specified in the project ESCP, and as a minimum must adhere to the following general conditions:
 - The discharge must not increase the downstream water quality by >20% (compared to upstream levels if applicable).
 - Water pH must be between 5.5 and 9 (particularly relevant if working with concrete).

- The discharge does not cause obvious visual discolouration of the downstream environment beyond 'reasonable mixing' (deemed as 30m from initial discharge point unless otherwise specified due to access restrictions).
- Permit to pump documentation must be available for inspection by GWRC upon request.

5.1.4 Stage Four

- The bridge sites will naturally be contained within controls established during stage one, and in the case of Bridge 3 footprint, will naturally be impounded. Additional localised diversion bunds will be installed if required around the perimeter of the bridge sites as works progresses to ensure that dirty water runoff or cement runoff is contained on site at all times.

Table 1: Relevant DWD bund height based on ESCP Appendix B calculations

Longitudinal Slope based on 1% (as a maximum)

Catchment Area (ha)	20 Year ARI Design Flow (m3/sec)	DWD Bund Height plus Freeboard (300mm) (m)
0.5	0.027	0.45
1	0.055	0.55
1.5	0.082	0.6
2	0.109	0.65
2.5	0.137	0.7
3	0.164	0.75
3.5	0.191	0.8
4	0.219	0.8
4.5	0.246	0.85
5	0.274	0.85

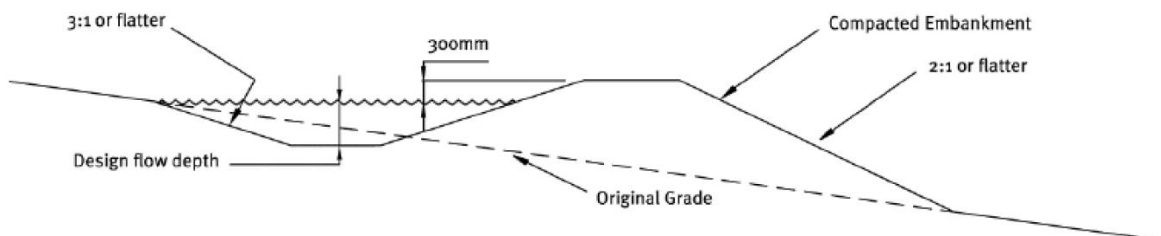


Figure 1: Typical cross section of dirty water diversion bund in accordance with the ESCP

5.2 Re-vegetation

At this early stage, permanent planting and re-grassing will not take place given the temporary nature of the earthworks for this particular location. Temporary stabilisation measures will be utilised to ensure that erosion potential is reduced, particularly in regards to the large dune locations. Erosion protection such as temporary mulch, grass seed or geotextiles may be used which will also double up as dust suppression.

Final design and planting details will be provided at a later date and implemented in accordance with the final SSEMP for this area.

5.3 Quarrying

Aggregate is required for Bridge 2 and 3 MSE walls, and crane pad construction and will be sourced from the Ōtaki Gorge Road area. Estimated volumes are as follows:

- Bridge 2 east: 2600m³
- Bridge 2 west and Bride 3 east: 7500m³
- Bridge 3 west: 2700m³
- Crane pad construction 900m³

6 ECOLOGICAL REQUIREMENTS

Appendix C outlines areas that require ecological input prior to and / or during construction. The following sections outline site specific requirements in regards to ecology.

6.1 General requirements

- Areas marked as 'vegetation to be retained' on the attached drawings will be marked on site to provide a visible barrier for the contractor carrying out site vegetation clearance works.
- A suitably qualified ecologist will remain involved throughout the works and provide expert input where required.
- Ecologically sensitive areas as identified on the attached maps in Appendix C will be marked on site and 'no-go areas' such as the Ōtaki railway Wetland, and will be communicated clearly to the contractor undertaking the works.

6.2 Pipit

Locations for potential Pipit habitat have been identified in Appendix C extending from the 'northern dune' between Chainage 1000 – 1450. In accordance with the EMP, pipit surveys will take place in spring/summer prior to commencement of vegetation clearance, due to be carried out in accordance with SSEMP PW1 'Vegetation Clearance and Enabling Works'. Due to the large area of potential habitat, it is not practical to mark off the entire area. Instead, the attached drawings showing the identified areas will be provided to the contractor(s) undertaking the works and a pre-site meeting will take place with the project ecology team to ensure that the survey requirements have been satisfied and clearance work can commence.

The survey will be carried out by a qualified ornithologist and will involve grid-searching the project designation within the areas identified as potential pipit habitat. The number of birds seen and site locations will be recorded on GPS. If pipit are found, vegetation clearance will need to be stopped until the pipit have vacated the area.

If the above has not taken place prior to commencement of earthworks at the northern dune, then this process will need to be followed within 48 hours of works commencement.

6.3 Ecological Monitoring

There are no ecological monitoring requirements associated with these works. Pre-works ecological surveys to identify pipit will be carried out if required as outlined in the previous section.

6.4 Aquatic Species Relocation

Relocation of fish species will not be required under this SSEMP.

7 STREAMWORKS

Streamworks are not required under this SSEMP and therefore requirements specific to streamworks activities will not be included at this stage.

8 STORMWATER

8.1 Permanent Culverts

Permanent 'Culvert 12' will be constructed prior to commencement of works on Bridge 2 MSE wall. This will eventually convey overflow from the future remnant Ōtaki Railway Wetland to the south. The full culvert length will not be installed until access to the wetland is permitted under the next SSEMP. At this stage, only the section beneath the Bridge 2 MSE will be constructed.

Permanent Culvert 12 will be constructed off-line of any existing watercourses in accordance with final stormwater design details. Dewatering for culvert installation is not required. Refer to Appendix E drawings for culvert details.

The permanent culvert to the west of the railway SDMH-6C to SDMH-6.14 will be constructed beneath the new rail embankment. The culvert will be constructed off-line from any wetland or watercourse.

Final details are currently under review and will be submitted as an amendment to this SSEMP following confirmation of design details.

8.2 Temporary Culverts

Stormwater overflow from State Highway 1 currently flows from an existing pipe into the Ōtaki Railway Wetland. A 600 diameter pipe will be attached to this existing pipe to allow stormwater to continue to flow into the wetland beneath the haul road constructed during Stage One works.

The pipe has been sized by the project stormwater team to meet the requirements of Condition WS.12, outlined below.

Temporary Culverts	
WS.12	All temporary culverts shall be designed to meet the following criteria unless otherwise agreed with the Manager: <ol style="list-style-type: none"> a) To pass a 50% AEP flood event without heading up (as assessed at the time of Commencement of Construction); b) Culverts to be installed 300mm below stream bed level in order to provide a continuous wetted perimeter to facilitate the passage of native fish species; and c) Minimum size of any temporary culvert shall be not less than 600mm in diameter.

Details relating to the existing pipe extension are as follows:

- 600mm diameter pipe extension to connect overland flow to existing Railway Wetland.
- 50% AEP flood event (excluding climate change) has been used to estimate design flow.
- Rainfall intensity has been estimated using the method described in the KCDC subdivision guidelines.
- The rational method has been used to estimate design flow.
- Mannings equation has been used to estimate the pipe capacity.
- Nomographs from the Surface Water building code have been used to estimate the culvert size.
- Temp culvert size not less than 600mm as per consent conditions.
- Fish passage not required as culvert is not through or diverting a natural stream but is collecting overland surface water.

Prompt installation of the pipe extension will be important to avoid water flowing into the work site during the initial topsoil / peat stripping and undercut. As a contingency, the following will be in place to manage water effectively:

- A fine weather window will be targeted for the initial works.
- A flexible flume (600dia) will be attached to the existing stormwater pipe following vegetation clearance works in the area.
- In the event that rain is forecast, this flexible flume will be rolled out to connect to the Railway Wetland to convey clean water overflow from SH1.

An internal technical review of the design of the temporary pipe extension has been carried out by the Tonkin & Taylor Stormwater Team. See Appendix A for details of the design reviewers.

9 AIR QUALITY

High risk locations in regards to air quality have been identified in Appendix C. Particular care will be taken during the planning stage of the works to ensure that nuisance air discharges are prevented from crossing the boundary. All works will be carried out in general accordance with the mitigation measures outlined in the CAQMP with emphasis placed on ensuring that adjacent landowners are not impacted by dust or odour generated by the works.

Given the minor nature of the earthworks required, it is not anticipated that air quality issues will arise from the works. However, to ensure that dust does not become an issue across the boundary of the site, the following measures will be implemented as a minimum:

- Minimising the amount of exposed area open at any one time
- Use of water carts as required during carting of materials
- Imposing a speed limit if required
- Use of stabilising agents such as polymers, temporary mulch or grasses
- Assessing wind speed and direction prior to excavating in 'high risk' locations

9.1 Transport of Materials

Aggregate will be transferred to site from Ōtaki Gorge Road. Approximately 14,000m³ of aggregate will be carted to the two bridge sites.

A risk assessment will be made by the site supervisor to assess whether there is potential for the material to create an air discharge concern. In cases where a risk is identified, materials will be covered to prevent air discharge to adjacent properties and / or SH1 and local roads.

10 NOISE AND VIBRATION

High-risk areas in regards to potential noise and vibration effects as a result of works have been identified in Appendix C. Individual dwellings located within the high risk areas have also been listed below.

In accordance with the CNVMP, works carried out under this SSEMP will generally be restricted to take place between the hours of:

- 0630 and 2000hrs on weekdays; and
- 0730 and 1800hrs on Saturdays.

As far as practicable, works will be scheduled to avoid noisy activities in areas identified as sensitive receivers on the attached drawings between 0630 – 0730hrs in the morning, and between 1800 – 2000hrs in the evening to align with noise level criteria outlined in the CNVMP.

It is not anticipated that works will be required to take place outside of normal working hours for works outlined in this SSEMP. In the event that this changes, the procedures outlined in the CNVMP will be followed. Any works outside of the hours of 7am to 7pm require written approval also from the Project Engineer.

The primary mitigation measure in regards to reducing the impacts from construction noise and vibration will be ongoing effective community consultation, particularly when transitioning from one works phase to another.

Noise and vibration monitoring will take place throughout the works to assess the impacts on adjacent properties at various locations. In the event that noise or vibration criteria is exceeded, mitigation

options will be reassessed in an effort to comply with the construction limits, and a site specific noise 'schedule' will be submitted to Kapiti Coast District Council in accordance with the CNVMP.

Dwellings located within the noise and vibration boundary are as follows:

- 273a Main Road
- 275a Main Road (medium risk as per CNVMP section 7)
- Cottage park Motor Lodge

Dwellings located within the vibration boundary only are as follows:

- 277a Main Road (medium risk as per CNVMP section 7)
- 281 Main Road
- 283 Main Road
- 285 Main Road
- 276 Main Road
- 280 Main Road
- 3C Te Manuao Road
- Cottage Park Travel Lodge
- 48 County Road
- 46 County Road

Commercial structures located within the vibration boundary are as follows:

- 271 Main Road
- 273 Main Road
- 291 Main Road

10.1 Pre-condition Building Surveys

Section 7 of the CNVMP outlines activities that are expected to generate vibration that will potentially cause medium and high level vibration and therefore must be assessed to determine whether a pre-condition building survey is required. The activities specified in Section 7 of the CNVMP will not be carried out under this SSEMP.

Two properties, however, fall into the 'medium risk' category for vibration associated with the *future* rail tamping works and will require pre-condition building surveys to be carried out prior to this time. These properties are:

- 277a Main Highway
- 275a Main highway

Pre-condition surveys may also be offered to additional properties over and above the requirements specified in the CNVMP, at the discretion of the Stakeholder and Communications Manager.

11 TRAFFIC

A Site Specific Traffic Management Plan has been included as Appendix H relevant to the works due to commence under this SSEMP.

APPENDIX A – SSEMP AUTHORS

Name	Role	Company	Input
Ed Breese	Stakeholder, Communications and Compliance Manager	Tonkin and Taylor	All
Alice Naylor	Environmental Manager	Higgins	All
Richard Rakovics	Project Civils Manager	Fletcher Construction	Enabling Earthworks Methodology
Craig Service	Structures Manager	Fletcher Construction	Bridge Works Methodology
Macu Waga	Site Engineer	Fletcher Construction	General sequencing and works methodology
Michelle Knapstein	Stormwater Engineer	Tonkin & Taylor	Stormwater details – temporary design
Dewi Knapstein	Project Lead – Water Resources Engineer	Tonkin & Taylor	Stormwater review – temporary design

APPENDIX B – CONSULTATION RECORD

Group	Date
Community Liaison Group (CLG)	Works due to commence under this SSEMP were presented to the CLG 18 th September 2017.
Community Liaison Group (CLG)	SSEMP draft submitted to the CLG for comments
Community Liaison Group (CLG)	Works update and request for feedback 6 th November

Outstanding Queries

The following outlines any queries (relevant to works covered under this SSEMP) that have not been resolved through the SSEMP preparation process, but will instead be closed out via alternative project stakeholder and communication channels:

- There are currently no outstanding queries that have been raised by members of the community relevant to these works.

APPENDIX C – DRAWINGS

Works Methodology Stage 1-4

STAGE 1: East of the existing railway

Extent of works (stage 1):
 - Stripping topsoil and peat undercut to form dirty water diversion bunds along the Otaki Railway Wetland.
 - Use of sand from the 'Northern Dune' to backfill as required beneath the off-ramp footprint and haul road.
 - Peat undercut and subsequent sand backfill beneath the Bridge 2 MSE wall footprint including installation of Culvert 12 in the dry.

Storage Area for:
 - Sign-in shed
 - Contractor caravan
 - 1 x container for storage of oils and site tools.
 - Skip bin for site waste (located away from neighbouring properties).

Approximate haul road alignment from the 'Northern Dune' to Bridge 2.

Approximate MSE footprint Bridge 2

Location of Culvert 12 to be constructed in the dry.

Approximate stockpile location

Extension of existing stormwater line to allow clean water to maintain flows into the wetland

Extent of Otaki railway Wetland (no go area)







Available sand source - 'Northern Dune'

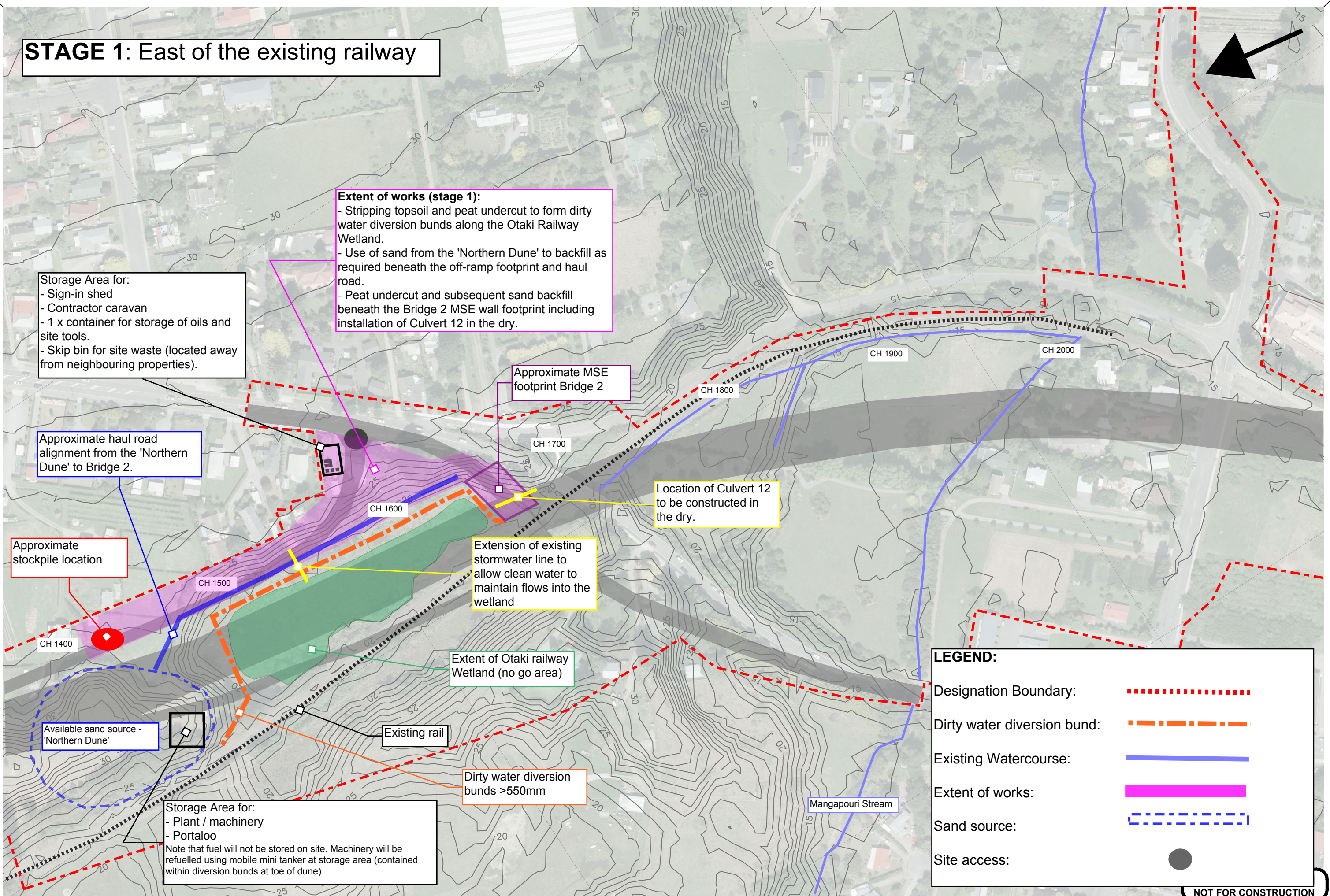
Existing rail

Dirty water diversion bunds >550mm

Storage Area for:
 - Plant / machinery
 - Portaloo
 Note that fuel will not be stored on site. Machinery will be refuelled using mobile mini tanker at storage area (contained within diversion bunds at toe of dune).

LEGEND:

- Designation Boundary: 
- Dirty water diversion bund: 
- Existing Watercourse: 
- Extent of works: 
- Sand source: 
- Site access: 



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A SEMP FOR INFORMATION		AK GD AN	20.07.17
No.	Revision	By	Chk

Scale (A1)	1:1000	Design	AN	13.07.17	Approved For Construction
Scale (A3)		Drawn	AK	18.07.17	
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		Date			

NZ TRANSPORT AGENCY
 Peka Peka to Otaki Expressway
 HIGGINS
 BECA
 Tonkin+Taylor

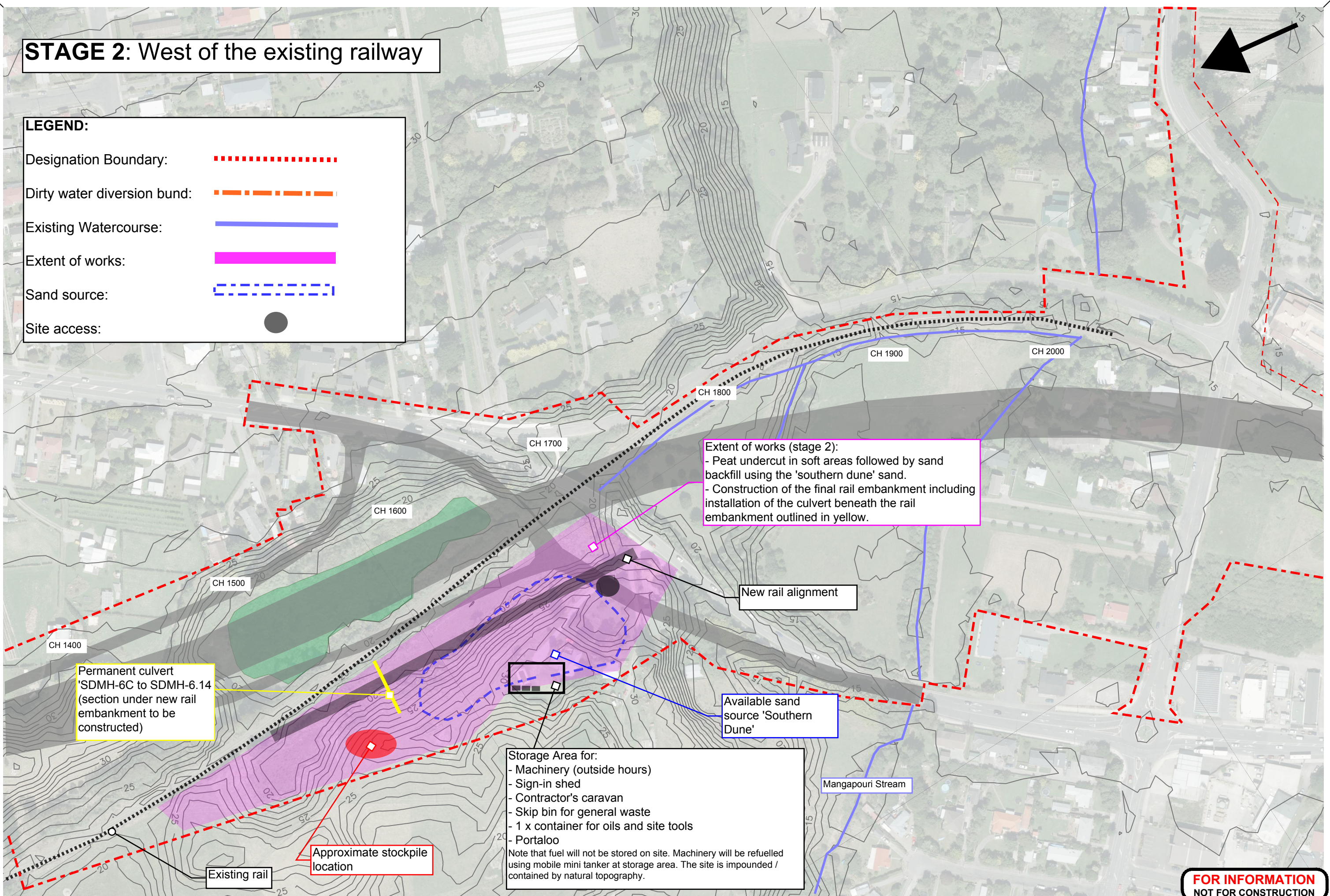
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Title:	Stage 1	Drawing No.:	SSEMP-NZ1-1
		Rev:	B

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STAGE 2: West of the existing railway

LEGEND:

- Designation Boundary: - - - - -
- Dirty water diversion bund: - - - - -
- Existing Watercourse: —
- Extent of works:
- Sand source:
- Site access:



Extent of works (stage 2):
 - Peat undercut in soft areas followed by sand backfill using the 'southern dune' sand.
 - Construction of the final rail embankment including installation of the culvert beneath the rail embankment outlined in yellow.

Permanent culvert 'SDMH-6C to SDMH-6.14 (section under new rail embankment to be constructed)

Storage Area for:
 - Machinery (outside hours)
 - Sign-in shed
 - Contractor's caravan
 - Skip bin for general waste
 - 1 x container for oils and site tools
 - Portaloo
 Note that fuel will not be stored on site. Machinery will be refuelled using mobile mini tanker at storage area. The site is impounded / contained by natural topography.

Approximate stockpile location

Available sand source 'Southern Dune'

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Title:	Stage 2

Discipline:	CIVIL
Drawing No.:	SSEMP-NZ1-2
Rev.:	B

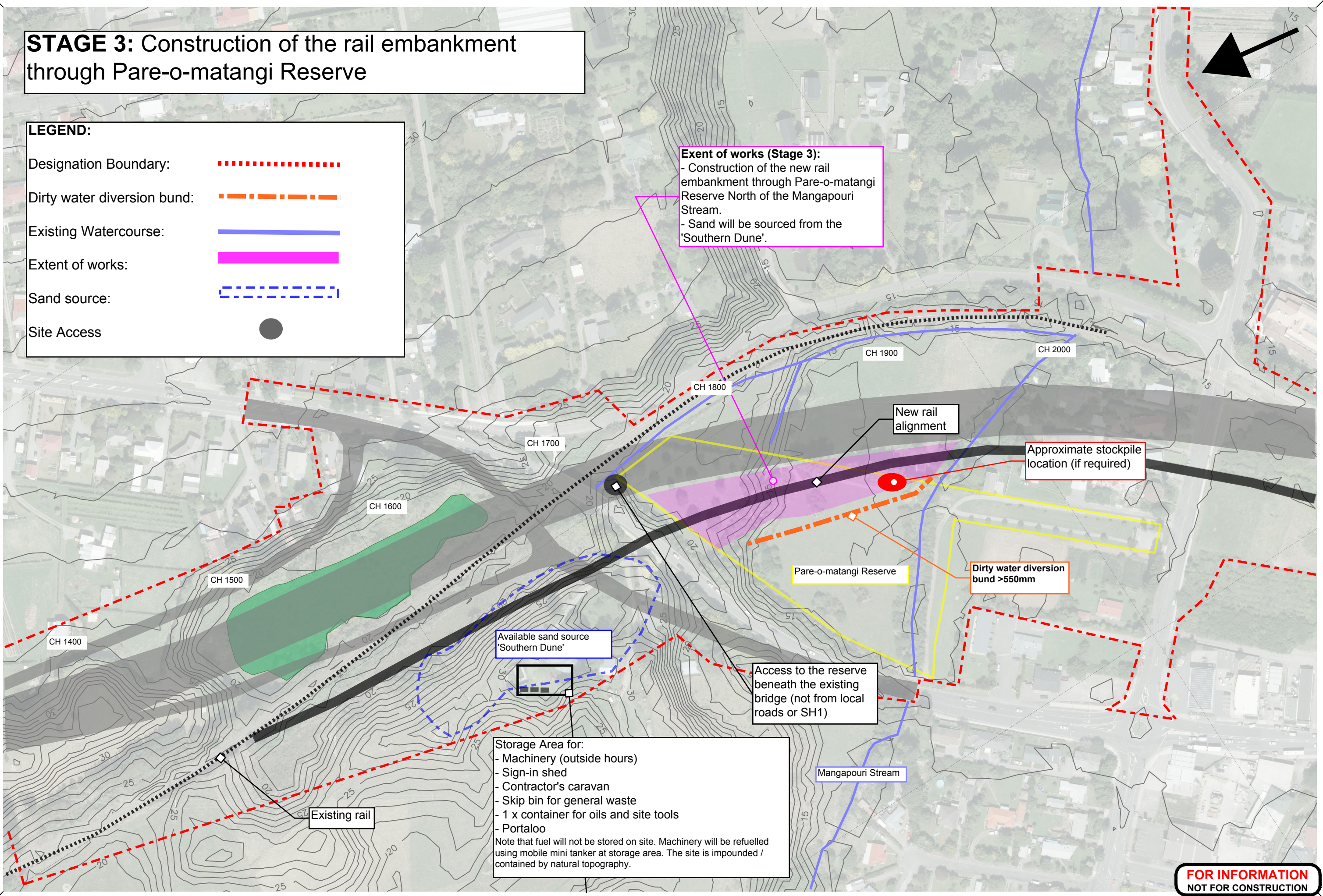
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STAGE 3: Construction of the rail embankment through Pare-o-matangi Reserve

LEGEND:

- Designation Boundary:
- Dirty water diversion bund:
- Existing Watercourse:
- Extent of works:
- Sand source:
- Site Access:

Extent of works (Stage 3):
 - Construction of the new rail embankment through Pare-o-matangi Reserve North of the Mangapouri Stream.
 - Sand will be sourced from the 'Southern Dune'.



Storage Area for:

- Machinery (outside hours)
- Sign-in shed
- Contractor's caravan
- Skip bin for general waste
- 1 x container for oils and site tools
- Portaloo

Note that fuel will not be stored on site. Machinery will be refuelled using mobile mini tanker at storage area. The site is impounded / contained by natural topography.

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HIGGINS







BECA **Tonkin+Taylor**

Subject:	SSEMP NZ1 Enabling Earthworks	Discipline:	CIVIL
Title:	Stage 1	Drawing No.:	SSEMP-NZ1-3
		Rev.:	B

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STAGE 4: Construction of Bridge's 2 and 3

LEGEND:

- Designation Boundary: 
- Dirty water diversion bund: 
- Existing Watercourse: 
- Extent of works: 
- Sand source: 
- Site access: 

Storage Area for:

- Sign-in shed
- Contractor caravan
- 1 x container for storage of oils and site tools.
- Skip bin for site waste (located away from neighbouring properties).

NORTH OTAKI MAIN ROAD UNDERPASS 'BRIDGE 2'

Extent of works (Stage 4):

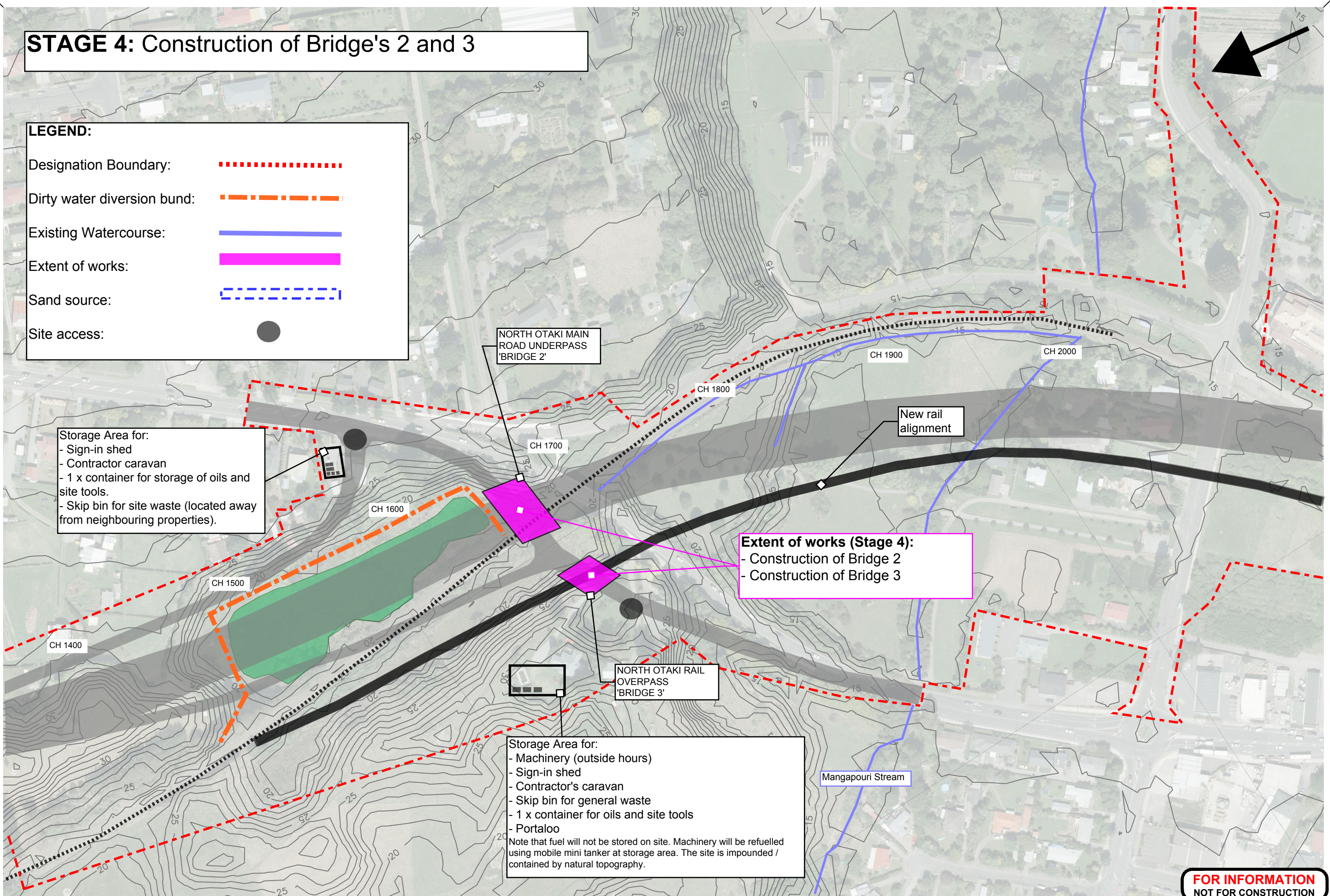
- Construction of Bridge 2
- Construction of Bridge 3

NORTH OTAKI RAIL OVERPASS 'BRIDGE 3'

Storage Area for:

- Machinery (outside hours)
- Sign-in shed
- Contractor's caravan
- Skip bin for general waste
- 1 x container for oils and site tools
- Portaloo

Note that fuel will not be stored on site. Machinery will be refuelled using mobile mini tanker at storage area. The site is impounded / contained by natural topography.



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Peka Peka to Otaki Expressway



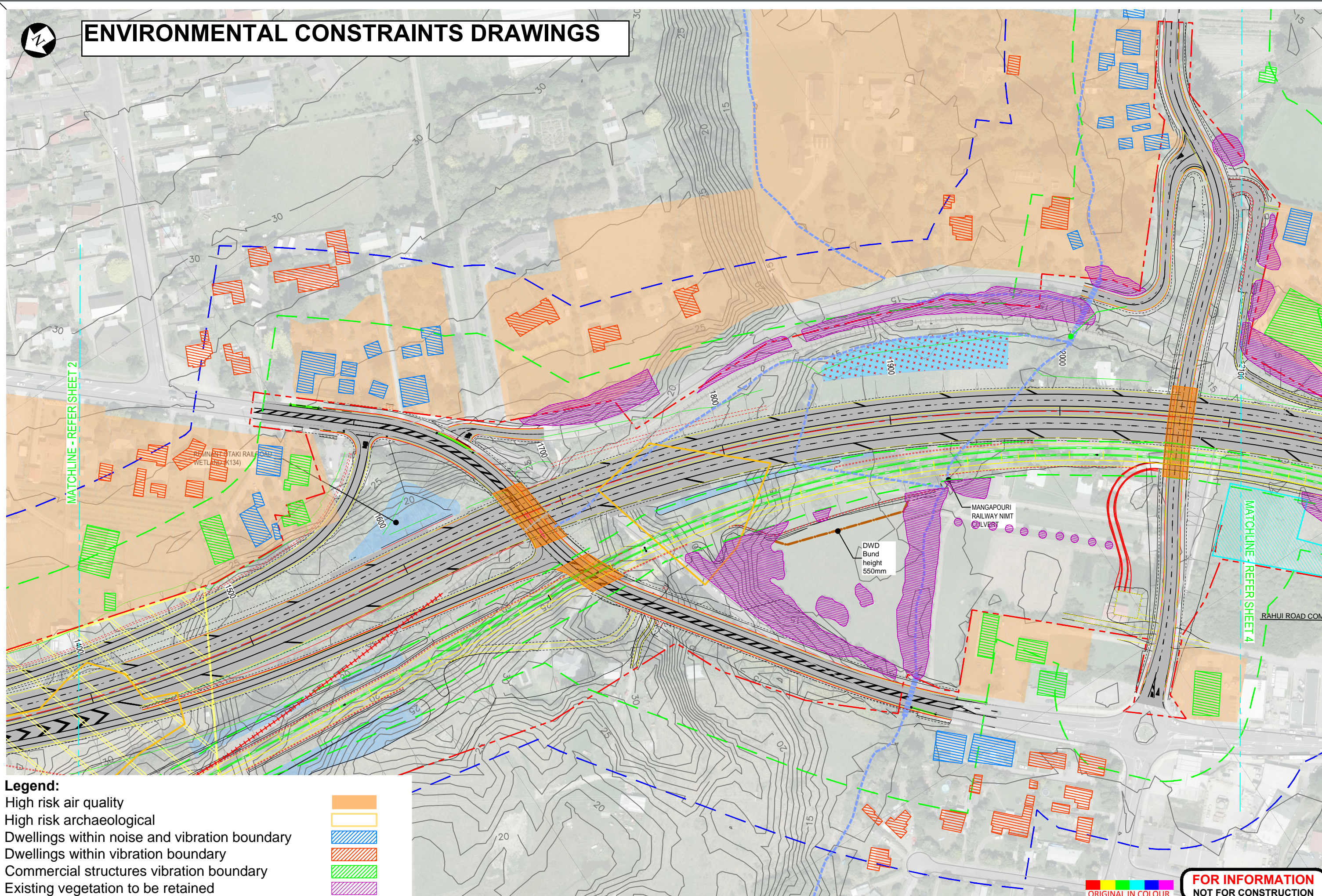
Subject:	SSEMP NZ1 Enabling Earthworks	Discipline:	CIVIL
Title:	Stage 4	Drawing No.:	SSEMP-NZ1-4
		Rev.:	B

Document No. \\M2PPSP\FCC\INTERNAL\DA\WWW\ROOT\20010270 SECTOR GENERAL\PRECAS\WORKING SHOP DRAWINGS\SSEMP\FOR ALICE\PP20-DR-CE-0811-0818 2017-08-28 STANDARD\S\SAS.DWG

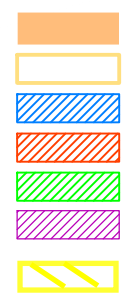
Environmental Constraints Drawing



ENVIRONMENTAL CONSTRAINTS DRAWINGS



- Legend:**
- High risk air quality
 - High risk archaeological
 - Dwellings within noise and vibration boundary
 - Dwellings within vibration boundary
 - Commercial structures vibration boundary
 - Existing vegetation to be retained
 - Potential pipit habitat requiring pre-works survey



ORIGINAL IN COLOUR

**FOR INFORMATION
NOT FOR CONSTRUCTION**

A SEMP FOR INFORMATION		AK	GD	AN	20.07.17
No.	Revision	By	Chk	Appd	Date

Scale (A3)	Dwg Check	Date
	* Refer to Original Handcopy for Signature	



Peka Peka to Otaki Expressway

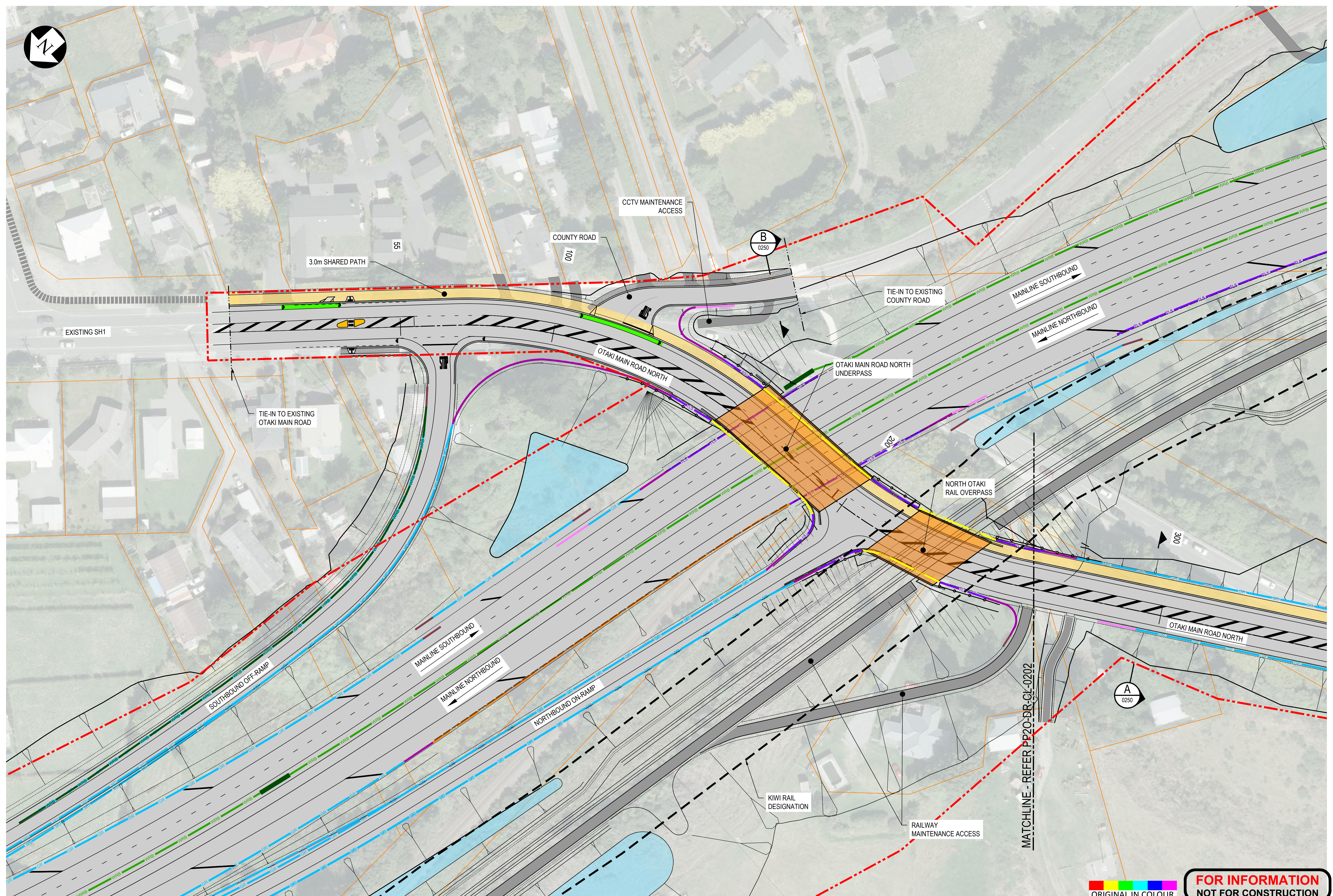


Subject:	SSEMP NZ1 Environmental Drawings
Title:	Sheet 1

Drawing No.	SSEMP-NZ1-5	Rev.	B
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Document No. \IMZPPSP\FCC\INTERNAL\DA\WWWROOT\2001\2710 SECTOR GENERAL\PRECAST WORKING SHOP DRAWINGS\SEMP\PP20-DR-CE-0818-0818_29-09-SET2.DWG

General Arrangement Construction Drawings (reference only for future general layout)



ORIGINAL IN COLOUR
FOR INFORMATION NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appt	Date
A	80% DESIGN	BJH	SP	BS	31.05.17

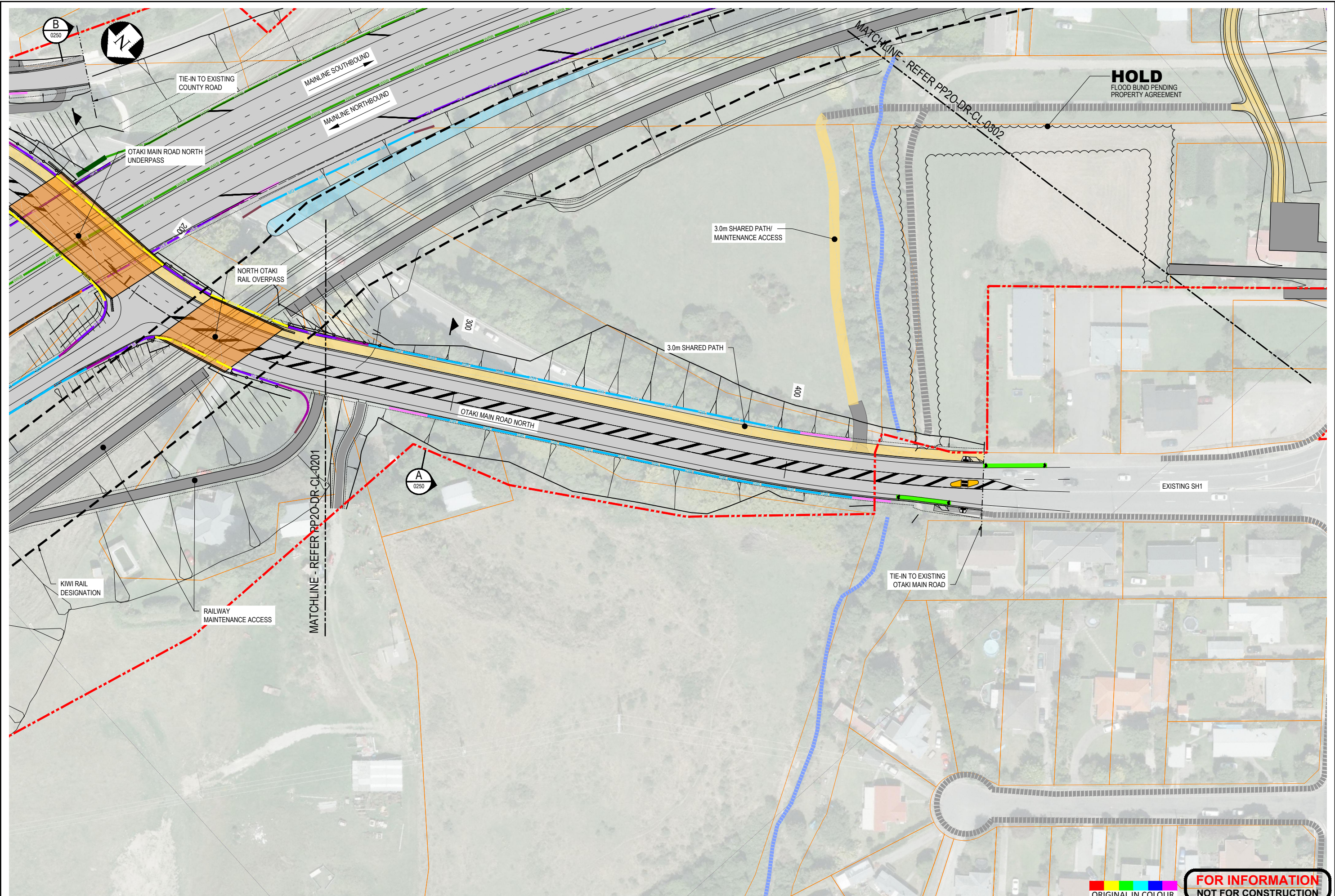
Design	S. PERMAN	12.05.17	Approved For Construction
Drawn	B. HALLIDAY	12.05.17	Date
Dwg Verifier			
Dwg Check			
* Refer to Original Hardcopy for Signature			

Peka Peka to Otaki Expressway

Subject: OTAKI MAIN ROAD NORTH
 Title: GENERAL ARRANGEMENT LAYOUT PLAN - SHEET 1 OF 2

Discipline	CIVIL
Drawing No.	PP20-DR-CL-0201
Rev.	A

Document No. R13000 - DESIGN DEVELOPMENT GENERAL/09 CAD/DRAWINGS/CE/PP20-DR-CL-0201-0202.DWG



No.	Revision	By	Chk	Appt	Date
A	80% DESIGN	BJH	SP	BS	31.05.17

Scale (A1)	Design	S. PERMAN	12.05.17	Approved For Construction
1:500 <td>Drawn</td> <td>B. HALLIDAY</td> <td>12.05.17 <td>Date</td> </td>	Drawn	B. HALLIDAY	12.05.17 <td>Date</td>	Date
Scale (A3)	Dwg Verifier			
	Dwg Check			

* Refer to Original Hardcopy for Signature

NZ TRANSPORT AGENCY WAIKAŪTAMAU

Peka Peka to Ōtaki Expressway

Fletcher HIGGINS

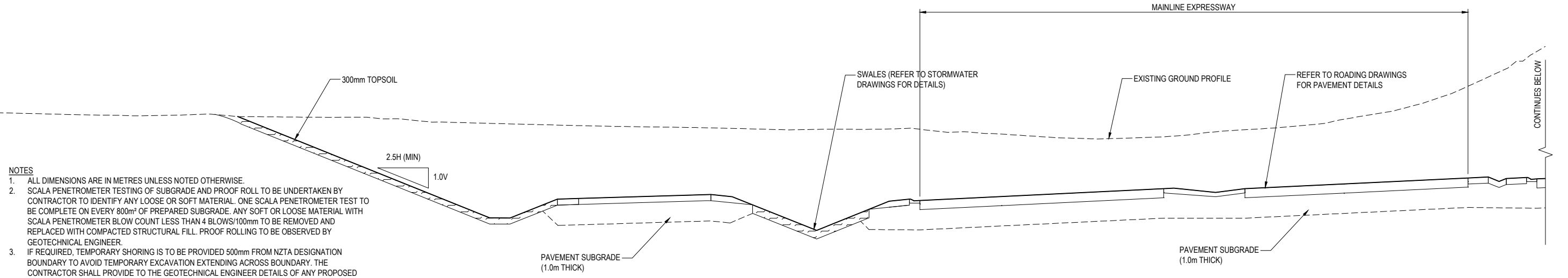
BECA **TFT** **Tonkin+Taylor**

Subject:	OTAKI MAIN ROAD NORTH
Title:	GENERAL ARRANGEMENT LAYOUT PLAN - SHEET 2 OF 2

Discipline:	CIVIL
Drawing No.:	PP20-DR-CL-0202
Rev.:	A

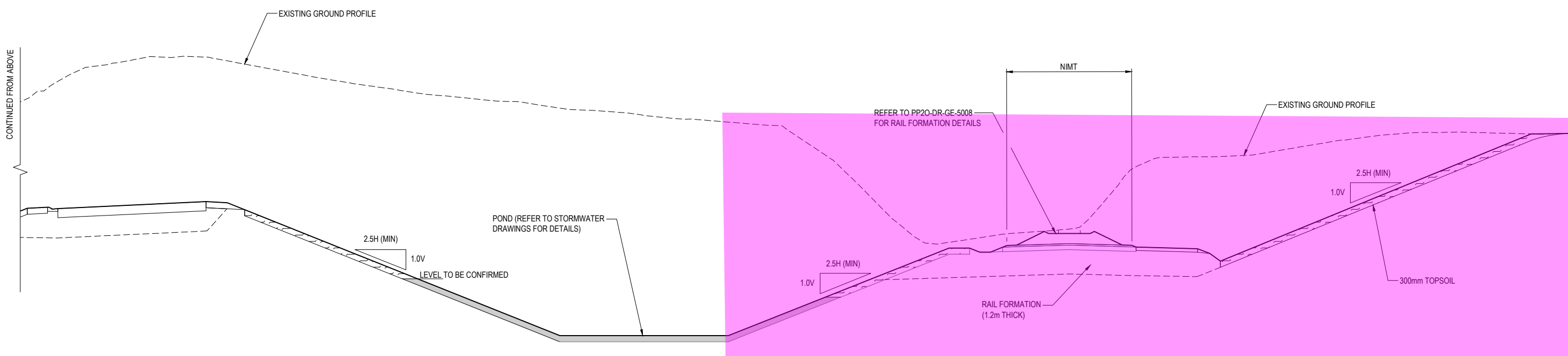
FOR INFORMATION NOT FOR CONSTRUCTION

NOTE: Relevant sections are highlighted in pink

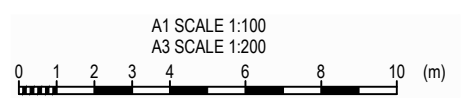


- NOTES**
1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 2. SCALA PENETROMETER TESTING OF SUBGRADE AND PROOF ROLL TO BE UNDERTAKEN BY CONTRACTOR TO IDENTIFY ANY LOOSE OR SOFT MATERIAL. ONE SCALA PENETROMETER TEST TO BE COMPLETE ON EVERY 800m² OF PREPARED SUBGRADE. ANY SOFT OR LOOSE MATERIAL WITH SCALA PENETROMETER BLOW COUNT LESS THAN 4 BLOWS/100mm TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL. PROOF ROLLING TO BE OBSERVED BY GEOTECHNICAL ENGINEER.
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 5. ADDITIONAL SUBSOIL DRAINAGE TO BE CONSTRUCTED IN ANY AREAS OF DAMP/WET SUBGRADE AS DIRECTED BY THE GEOTECHNICAL ENGINEER. SUBSOIL DRAINS TO BE CONNECTED TO STORMWATER SYSTEM VIA SUMPS. IF SUBSOIL DRAINAGE CANNOT BE CONNECTED TO STORMWATER SYSTEM (I.E. LEVEL IS BELOW SUMP INVERT LEVEL) THEN CLEAN GRANULAR FILL TO BE PLACED AND COMPACTED IN BASE OF EXCAVATION.
 6. REFER TO SPECIFICATION FOR ADDITIONAL REQUIREMENTS FOR PAVEMENT SUBGRADE AND RAIL FORMATION TESTING.
 7. REFER TO STANDARD DETAIL104 FOR TREATMENT OF TRANSITION AREA BETWEEN CUT & FILL.
 8. REFER TO STANDARD DETAIL 101 FOR TREATMENT OF TOPSOIL AND UNSUITABLE MATERIALS.

SECTION 7 CHAINAGE 1320 - 1500 TYPICAL CROSS SECTION
0023 1:100@A1, 1:200@A3



SECTION 7 CHAINAGE 1320 - 1500 TYPICAL CROSS SECTION CONTINUED
0023 1:100@A1, 1:200@A3



**PRELIMINARY
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	80% DESIGN	AK	RC	BS	18.08.17

Scale (A1)	Design	RAR	31.05.17	Approved For Construction
1:100	Drawn	AK	18.08.17	Date
Scale (A3)	Design	Check	Date	
	Dwg Check			

* Refer to Original Hardcopy for Signature

NZ TRANSPORT AGENCY WAIKATO REGION

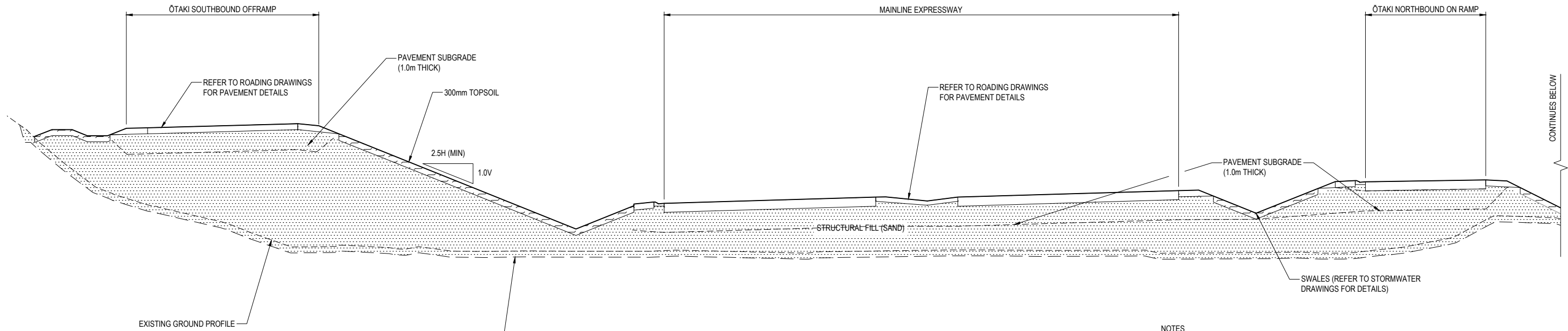
Peka Peka to Ōtaki Expressway

Fletcher HIGGINS

BECA **TFT** **Tonkin+Taylor**

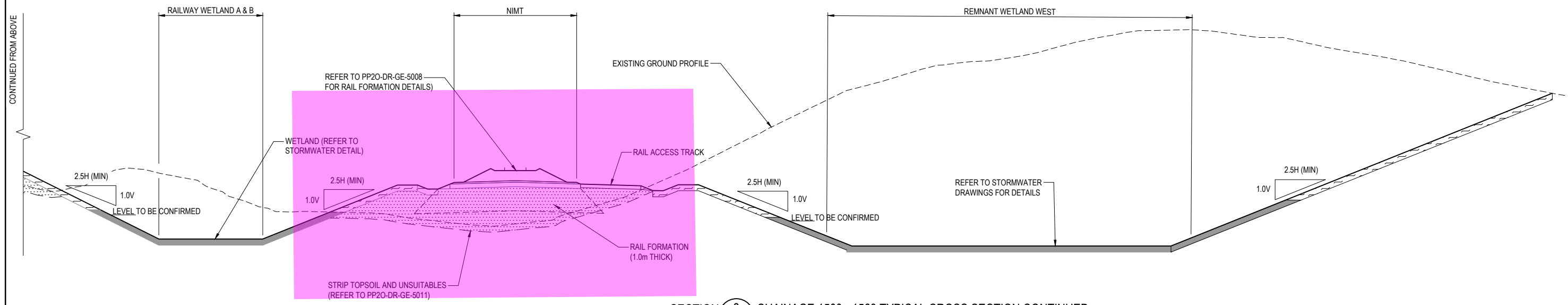
Subject:	EARTHWORKS	Discipline:	GEOTECHNICAL
Title:	GEOTECHNICAL CROSS-SECTIONS SHEET 5	Drawing No.:	PP20-DR-GE-0145
		Rev.:	A

Document No. R3000 - DESIGN DEVELOPMENT GENERAL09 CAD/DRAWINGS/GEPP20-DR-GE-0145-0149.DWG

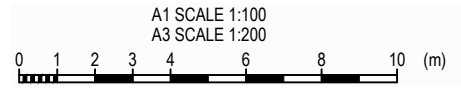


SECTION 8 CHAINAGE 1500 - 1560 TYPICAL CROSS SECTION
 0023 1:100@A1, 1:200@A3

- NOTES**
1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 2. SCALA PENETROMETER TESTING OF SUBGRADE AND PROOF ROLL TO BE UNDERTAKEN BY CONTRACTOR TO IDENTIFY ANY LOOSE OR SOFT MATERIAL. ONE SCALA PENETROMETER TEST TO BE COMPLETE ON EVERY 800m² OF PREPARED SUBGRADE. ANY SOFT OR LOOSE MATERIAL WITH SCALA PENETROMETER BLOW COUNT LESS THAN 4 BLOWS/100mm TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL. PROOF ROLLING TO BE OBSERVED BY GEOTECHNICAL ENGINEER.
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 7. REFER TO STANDARD DETAIL 104 FOR TREATMENT OF TRANSITION AREA BETWEEN CUT & FILL.
 8. REFER TO STANDARD DETAIL 101 FOR TREATMENT OF TOPSOIL AND UNSUITABLE MATERIALS.



SECTION 8 CHAINAGE 1500 - 1560 TYPICAL CROSS SECTION CONTINUED
 0023 1:100@A1, 1:200@A3



PRELIMINARY
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
A	80% DESIGN	AK	RC	BS	18.08.17

Design	RAR	31.05.17	Approved For Construction
Drawn	AK	18.08.17	Date
Scale (A1)	1:100		
Scale (A3)			
Dwg Check			
* Refer to Original Hardcopy for Signature			

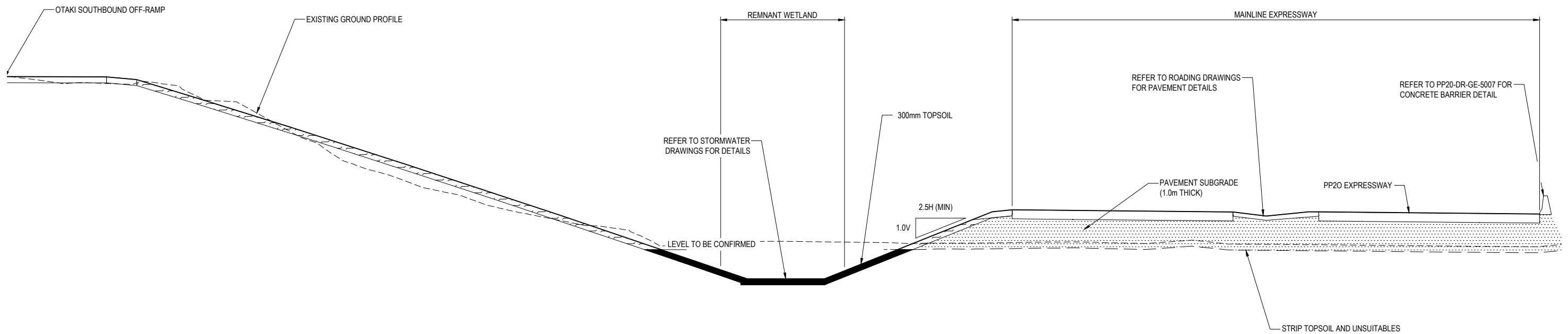
NZ TRANSPORT AGENCY WAIKATO REGION

Peka Peka to Otaki Expressway

Fletcher HIGGINS

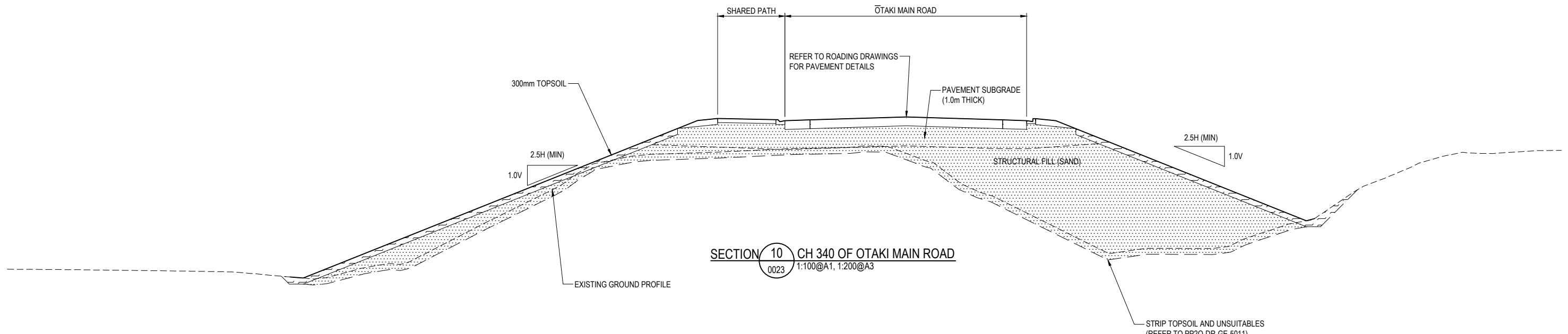
BECA **TFT** **Tonkin+Taylor**

Subject:	EARTHWORKS	Discipline:	GEOTECHNICAL
Title:	GEOTECHNICAL CROSS-SECTIONS SHEET 6	Drawing No.:	PP20-DR-GE-0146
		Rev.:	A

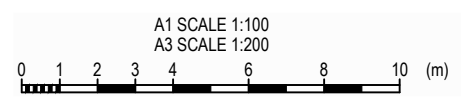


SECTION 9 OTAKI SOUTHBOUND OFF-RAMP
0023 1:100@A1, 1:200@A3

- NOTES**
1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 2. SCALA PENETROMETER TESTING OF SUBGRADE AND PROOF ROLL TO BE UNDERTAKEN BY CONTRACTOR TO IDENTIFY ANY LOOSE OR SOFT MATERIAL. ONE SCALA PENETROMETER TEST TO BE COMPLETE ON EVERY 800m² OF PREPARED SUBGRADE. ANY SOFT OR LOOSE MATERIAL WITH SCALA PENETROMETER BLOW COUNT LESS THAN 4 BLOWS/100mm TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL. PROOF ROLLING TO BE OBSERVED BY GEOTECHNICAL ENGINEER.
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 6. REFER TO SPECIFICATION FOR ADDITIONAL REQUIREMENTS FOR PAVEMENT SUBGRADE AND RAIL FORMATION TESTING.
 7. REFER TO STANDARD DETAIL 104 FOR TREATMENT OF TRANSITION AREA BETWEEN CUT & FILL.
 8. REFER TO STANDARD DETAIL 101 FOR TREATMENT OF TOPSOIL AND UNSUITABLE MATERIALS.



SECTION 10 CH 340 OF OTAKI MAIN ROAD
0023 1:100@A1, 1:200@A3



PRELIMINARY
NOT FOR CONSTRUCTION

Design	RAR	31.05.17	Approved For Construction
Drawn	AK	18.08.17	Date
Dwg Check			
* Refer to Original Hardcopy for Signature			

Scale (A1)	1:100
Scale (A3)	1:200

No.	Revision	By	Chk	Appd	Date
A	80% DESIGN	AK	RC	BS	18.08.17

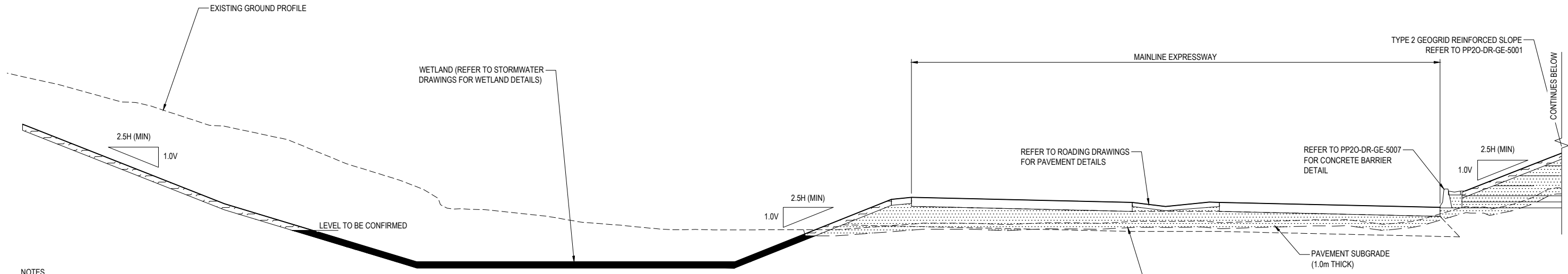
NZ TRANSPORT AGENCY WAIKA TŪKIAHI

Peka Peka to Ōtaki Expressway

Fletcher HIGGINS

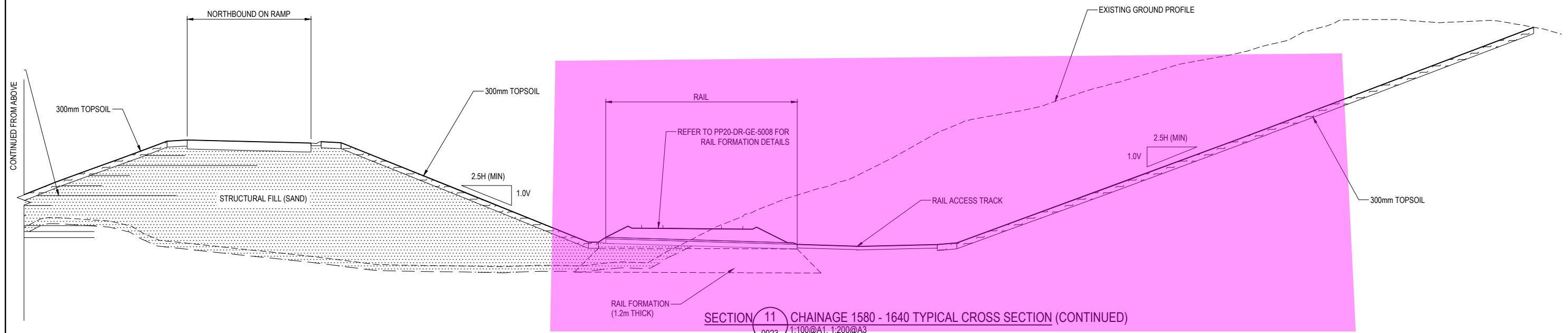
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Subject:	EARTHWORKS	Discipline:	GEOTECHNICAL
Title:	GEOTECHNICAL CROSS-SECTIONS SHEET 7	Drawing No.:	PP20-DR-GE-0147
		Rev.:	A

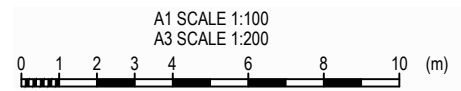


SECTION 11 CHAINAGE 1580 - 1640 TYPICAL CROSS SECTION
0023 1:100@A1, 1:200@A3

- NOTES**
1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
 2. SCALA PENETROMETER TESTING OF SUBGRADE AND PROOF ROLL TO BE UNDERTAKEN BY CONTRACTOR TO IDENTIFY ANY LOOSE OR SOFT MATERIAL. ONE SCALA PENETROMETER TEST TO BE COMPLETE ON EVERY 800m² OF PREPARED SUBGRADE. ANY SOFT OR LOOSE MATERIAL WITH SCALA PENETROMETER BLOW COUNT LESS THAN 4 BLOWS/100mm TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL. PROOF ROLLING TO BE OBSERVED BY GEOTECHNICAL ENGINEER.
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 7. REFER TO STANDARD DETAIL 104 FOR TREATMENT OF TRANSITION AREA BETWEEN CUT & FILL.
 8. REFER TO STANDARD DETAIL 101 FOR TREATMENT OF TOPSOIL AND UNSUITABLE MATERIALS.



SECTION 11 CHAINAGE 1580 - 1640 TYPICAL CROSS SECTION (CONTINUED)
0023 1:100@A1, 1:200@A3



PRELIMINARY
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
A	80% DESIGN	AK	RC	BS	18.08.17

Design	RAR	31.05.17	Approved For Construction
Drawn	AK	18.08.17	Date
Design Checker			
Checked			

* Refer to Original Hardcopy for Signature

NZ TRANSPORT AGENCY WAIKATO REGION

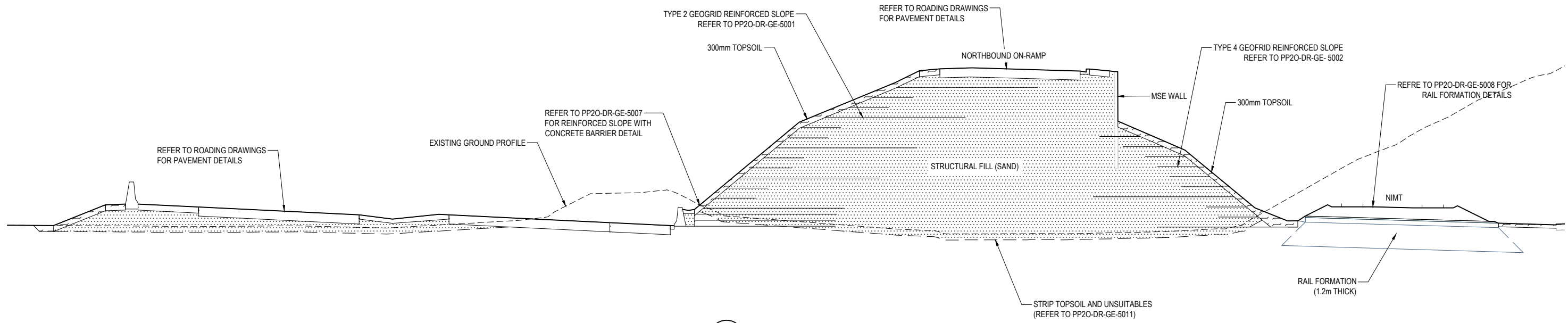
Peka Peka to Ōtaki Expressway

Fletcher HIGGINS

BECA

Tonkin+Taylor

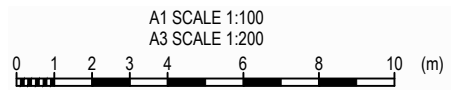
Subject:	EARTHWORKS	Discipline:	GEOTECHNICAL
Title:	GEOTECHNICAL CROSS-SECTIONS SHEET 8	Drawing No.:	PP20-DR-GE-0148
		Rev.:	A



SECTION 12 CH 1640-1670 TYPICAL CROSS SECTION
 0023 1:100@A1, 1:200@A3

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. SCALA PENETROMETER TESTING OF SUBGRADE AND PROOF ROLL TO BE UNDERTAKEN BY CONTRACTOR TO IDENTIFY ANY LOOSE OR SOFT MATERIAL. ONE SCALA PENETROMETER TEST TO BE COMPLETE ON EVERY 800m² OF PREPARED SUBGRADE. ANY SOFT OR LOOSE MATERIAL WITH SCALA PENETROMETER BLOW COUNT LESS THAN 4 BLOWS/100mm TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL. PROOF ROLLING TO BE OBSERVED BY GEOTECHNICAL ENGINEER.
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8. REFER TO STANDARD DETAIL 101 FOR TREATMENT OF TOPSOIL AND UNSUITABLE MATERIALS.



PRELIMINARY
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
A	80% DESIGN	AK	RC	BS	18.08.17

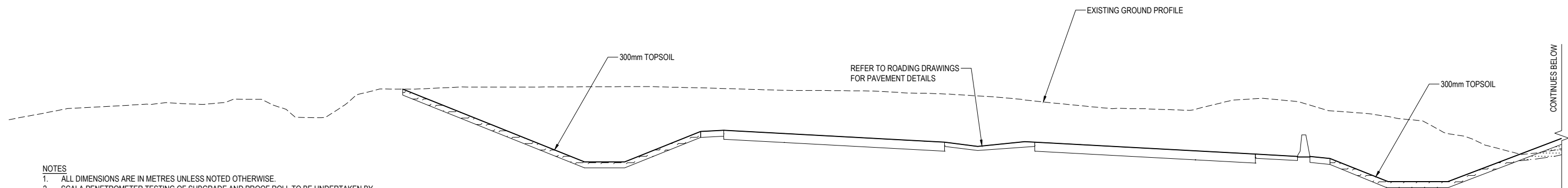
Design	RAR	31.05.17	Approved For Construction
Drawn	AK	18.08.17	Date
Dwg Verifier			
Dwg Check			

* Refer to Original Hardcopy for Signature

Peka Peka to Ōtaki Expressway

Subject:	EARTHWORKS
Title:	GEOTECHNICAL CROSS-SECTIONS SHEET 9

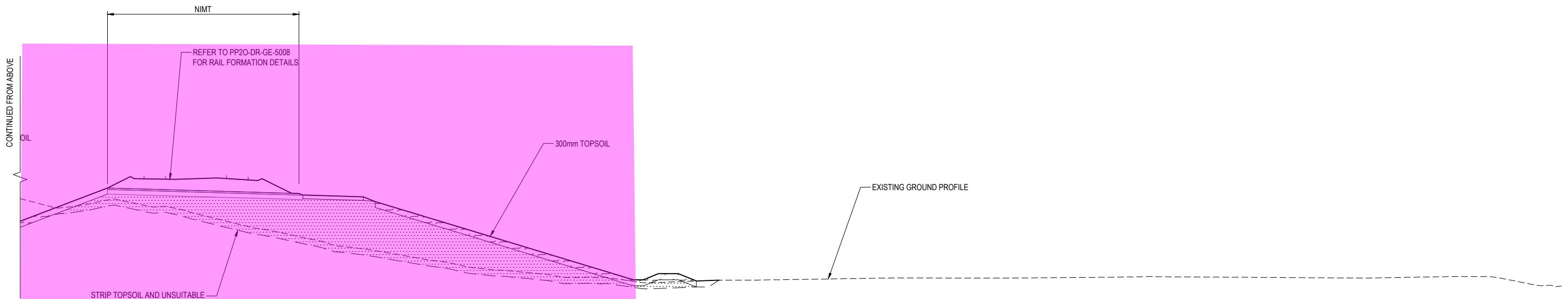
Discipline:	GEOTECHNICAL
Drawing No.:	PP20-DR-GE-0149
Rev.:	A



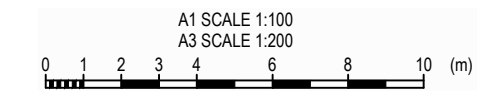
NOTES

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8. REFER TO STANDARD DETAIL 101 FOR TREATMENT OF TOPSOIL AND UNSUITABLE MATERIALS.

SECTION 13 CHAINAGE 1850 - 1980 TYPICAL CROSS SECTION
0023 1:100@A1, 1:200@A3



SECTION 13 CHAINAGE 1850 - 1980 TYPICAL CROSS SECTION CONTINUED
0023 1:100@A1, 1:200@A3



PRELIMINARY
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
A	80% DESIGN	AK	RC	BS	18.08.17

Scale (A1)	Design	RAR	31.05.17	Approved For Construction
1:100	Drawn	AK	18.08.17	Date
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* Refer to Original Hardcopy for Signature

NZ TRANSPORT AGENCY WAIKATO REGION

Peka Peka to Ōtaki Expressway

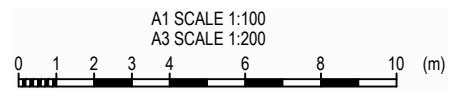
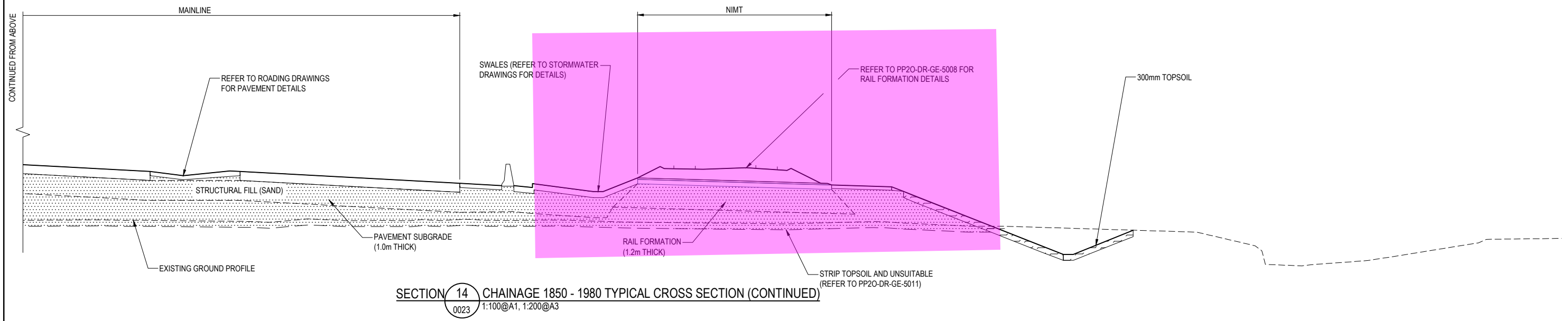
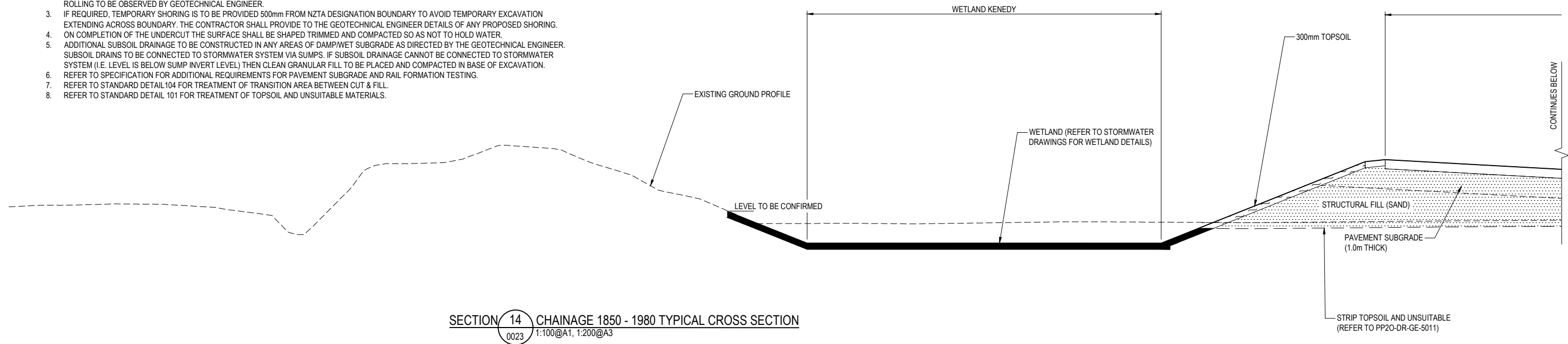
Fletcher HIGGINS

BECA **TFT** **Tonkin+Taylor**

Subject:	EARTHWORKS	Discipline:	GEOTECHNICAL
Title:	GEOTECHNICAL CROSS-SECTIONS SHEET 10	Drawing No.:	PP20-DR-GE-0150
		Rev.:	A

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. SCALA PENETROMETER TESTING OF SUBGRADE AND PROOF ROLL TO BE UNDERTAKEN BY CONTRACTOR TO IDENTIFY ANY LOOSE OR SOFT MATERIAL. ONE SCALA PENETROMETER TEST TO BE COMPLETE ON EVERY 800m² OF PREPARED SUBGRADE. ANY SOFT OR LOOSE MATERIAL WITH SCALA PENETROMETER BLOW COUNT LESS THAN 4 BLOWS/100mm TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL. PROOF ROLLING TO BE OBSERVED BY GEOTECHNICAL ENGINEER.
3. IF REQUIRED, TEMPORARY SHORING IS TO BE PROVIDED 500mm FROM NZTA DESIGNATION BOUNDARY TO AVOID TEMPORARY EXCAVATION EXTENDING ACROSS BOUNDARY. THE CONTRACTOR SHALL PROVIDE TO THE GEOTECHNICAL ENGINEER DETAILS OF ANY PROPOSED SHORING. ON COMPLETION OF THE UNDERCUT THE SURFACE SHALL BE SHAPED TRIMMED AND COMPACTED SO AS NOT TO HOLD WATER.
4. ADDITIONAL SUBSOIL DRAINAGE TO BE CONSTRUCTED IN ANY AREAS OF DAMP/WET SUBGRADE AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
5. SUBSOIL DRAINS TO BE CONNECTED TO STORMWATER SYSTEM VIA SUMPS. IF SUBSOIL DRAINAGE CANNOT BE CONNECTED TO STORMWATER SYSTEM (I.E. LEVEL IS BELOW SUMP INVERT LEVEL) THEN CLEAN GRANULAR FILL TO BE PLACED AND COMPACTED IN BASE OF EXCAVATION.
6. REFER TO SPECIFICATION FOR ADDITIONAL REQUIREMENTS FOR PAVEMENT SUBGRADE AND RAIL FORMATION TESTING.
7. REFER TO STANDARD DETAIL 104 FOR TREATMENT OF TRANSITION AREA BETWEEN CUT & FILL.
8. REFER TO STANDARD DETAIL 101 FOR TREATMENT OF TOPSOIL AND UNSUITABLE MATERIALS.



No.	Revision	By	Chk	Appd	Date
A	80% DESIGN	AK	RC	BS	18.08.17

Design	RAR	31.05.17	Approved For Construction
Drawn	AK	18.08.17	Date
Dwg Verifier			
Dwg Check			
* Refer to Original Hardcopy for Signature			

NZ TRANSPORT AGENCY WAIKATO REGION

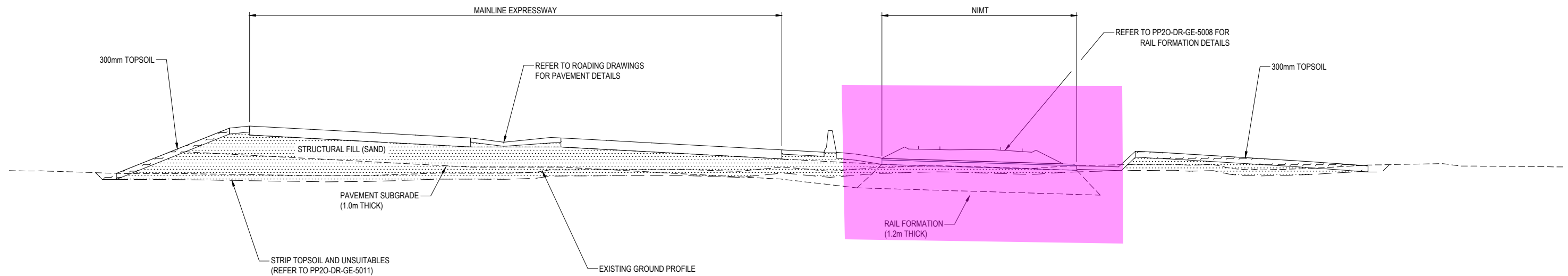
Peka Peka to Ōtaki Expressway

Fletcher HIGGINS

BECA **TFT** **Tonkin+Taylor**

Subject:	EARTHWORKS	Discipline:	GEOTECHNICAL
Title:	GEOTECHNICAL CROSS-SECTIONS	Drawing No.:	PP20-DR-GE-0151
	SHEET 11	Rev.:	A

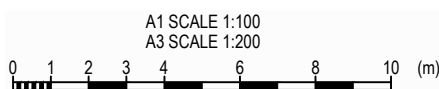
PRELIMINARY
NOT FOR CONSTRUCTION



SECTION 15 CHAINAGE 1980 - 2160 TYPICAL CROSS SECTION
0023 1:100@A1, 1:200@A3

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. SCALA PENETROMETER TESTING OF SUBGRADE AND PROOF ROLL TO BE UNDERTAKEN BY CONTRACTOR TO IDENTIFY ANY LOOSE OR SOFT MATERIAL. ONE SCALA PENETROMETER TEST TO BE COMPLETE ON EVERY 800m² OF PREPARED SUBGRADE. ANY SOFT OR LOOSE MATERIAL WITH SCALA PENETROMETER BLOW COUNT LESS THAN 4 BLOWS/100mm TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL. PROOF ROLLING TO BE OBSERVED BY GEOTECHNICAL ENGINEER.
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No.	Revision	By	Chk	Appd	Date
A	80% DESIGN	AK	RC	BS	18.08.17

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Scale (A3)	Dwg Check			
	Dwg Check			

* Refer to Original Hardcopy for Signature

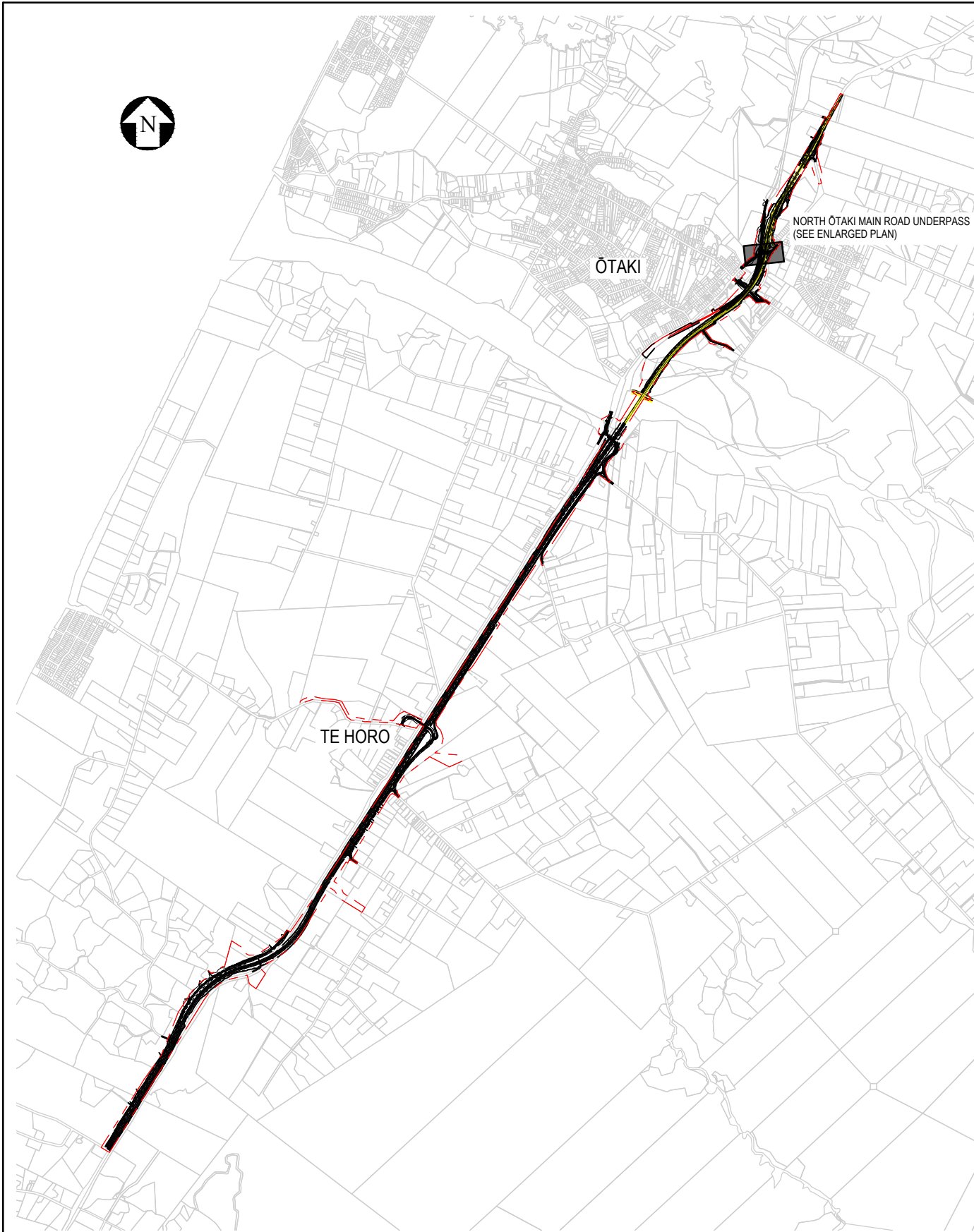
Peka Peka to Ōtaki Expressway

Subject:	EARTHWORKS
Title:	GEOTECHNICAL CROSS-SECTIONS SHEET 12

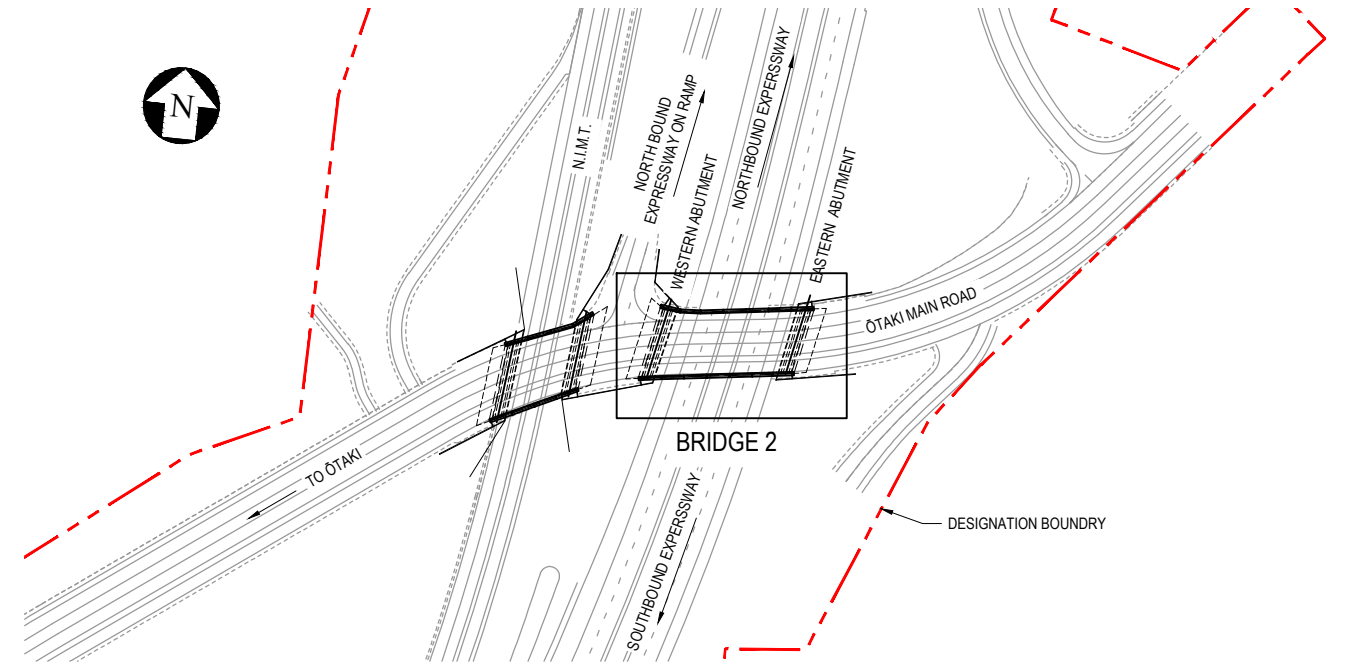
PRELIMINARY
NOT FOR CONSTRUCTION

Discipline:	GEOTECHNICAL
Drawing No.:	PP20-DR-GE-0152
Rev.:	A

Bridge Construction Drawings



LOCATION PLAN
NTS



ENLARGED PLAN
NTS

STRUCTURAL DRAWING LIST

DRAWING NUMBER	DRAWING NAME	REVISION
GENERAL NOTES		
PP20-DR-SA-0001	GENERAL NOTES	B
PP20-DR-SA-0002	GENERAL NOTES - REINFORCED CONCRETE SHEET 1	B
PP20-DR-SA-0003	GENERAL NOTES - REINFORCED CONCRETE SHEET 2	B
PP20-DR-SA-0004	GENERAL NOTES - STRUCTURAL STEEL	C
PROJECT DRAWINGS		
PP20-DR-SB-2000	COVER SHEET AND DRAWING LIST	C
PP20-DR-SB-2001	GENERAL ARRANGEMENT PLAN	C
PP20-DR-SB-2011	GENERAL ARRANGEMENT SECTIONS	C
PP20-DR-SB-2021	SUBSTRUCTURE SETOUT PLAN	C
PP20-DR-SB-2022	SUBSTRUCTURE DETAILS	B
PP20-DR-SB-2031	ABUTMENT BANK SEAT CONCRETE	B
PP20-DR-SB-2041	ABUTMENT BANK SEAT REINFORCEMENT	B
PP20-DR-SB-2081	VERTICAL GUIDE BEARING DETAILS	B
PP20-DR-SB-2083	POT BEARING DETAILS	B
PP20-DR-SB-2101	SUPERSTRUCTURE CONCRETE SHEET 1	B
PP20-DR-SB-2102	SUPERSTRUCTURE CONCRETE SHEET 2	B
PP20-DR-SB-2121	BACK WALL CONCRETE	B
PP20-DR-SB-2125	BACK WALL REINFORCEMENT SHEET 1	B
PP20-DR-SB-2126	BACK WALL REINFORCEMENT SHEET 2	B
PP20-DR-SB-2161	DECK REINFORCEMENT	B
PP20-DR-SB-2191	EARTHWORKS, BACKFILLING, AND DRAINAGE	A

STRUCTURAL DRAWING LIST

DRAWING NUMBER	DRAWING NAME	REVISION
STANDARD DRAWINGS		
PP20-DR-SD-0010	NOTES FOR PRECAST AND PRE-TENSIONED BRIDGE BEAMS	B
PP20-DR-SD-0011	1525 SUPER T BEAM - TYPICAL GEOMETRY	B
PP20-DR-SD-0013	1525 SUPER T BEAM - PRE-STRESSING DETAILS (36.8m SPAN)	B
PP20-DR-SD-0014	1525 SUPER T BEAM - REINFORCEMENT DETAILS SHEET 1	B
PP20-DR-SD-0015	1525 SUPER T BEAM - REINFORCEMENT DETAILS SHEET 2	B
PP20-DR-SD-0031	SUPER T BEAM - COMMON DETAILS	C
PP20-DR-SD-0101	TL5 PRECAST BARRIER SHEET 1	C
PP20-DR-SD-0102	TL5 PRECAST BARRIER SHEET 2	C
PP20-DR-SD-0201	EDGE BARRIER RAIL SHEET 1	C
PP20-DR-SD-0202	EDGE BARRIER RAIL SHEET 2	B
PP20-DR-SD-0401	SETTLEMENT SLAB DETAILS	B
PP20-DR-SD-0601	STRUCTURAL FACING PANELS SHEET 1	A
PP20-DR-SD-0602	STRUCTURAL FACING PANELS SHEET 2	A

No.	Revision	By	Chk	Appd	Date
C	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
B	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17
A	30% DESIGN REVIEW	MAJ	ARK	JK	10.04.17

Scale (A1) AS SHOWN	Design	Date	Approved For Construction
Scale (A3)	A.KIVELL	10.04.17	
	C.BURKE	09.03.17	
	G.BROWN	07.09.17	
	B.FLYNN		

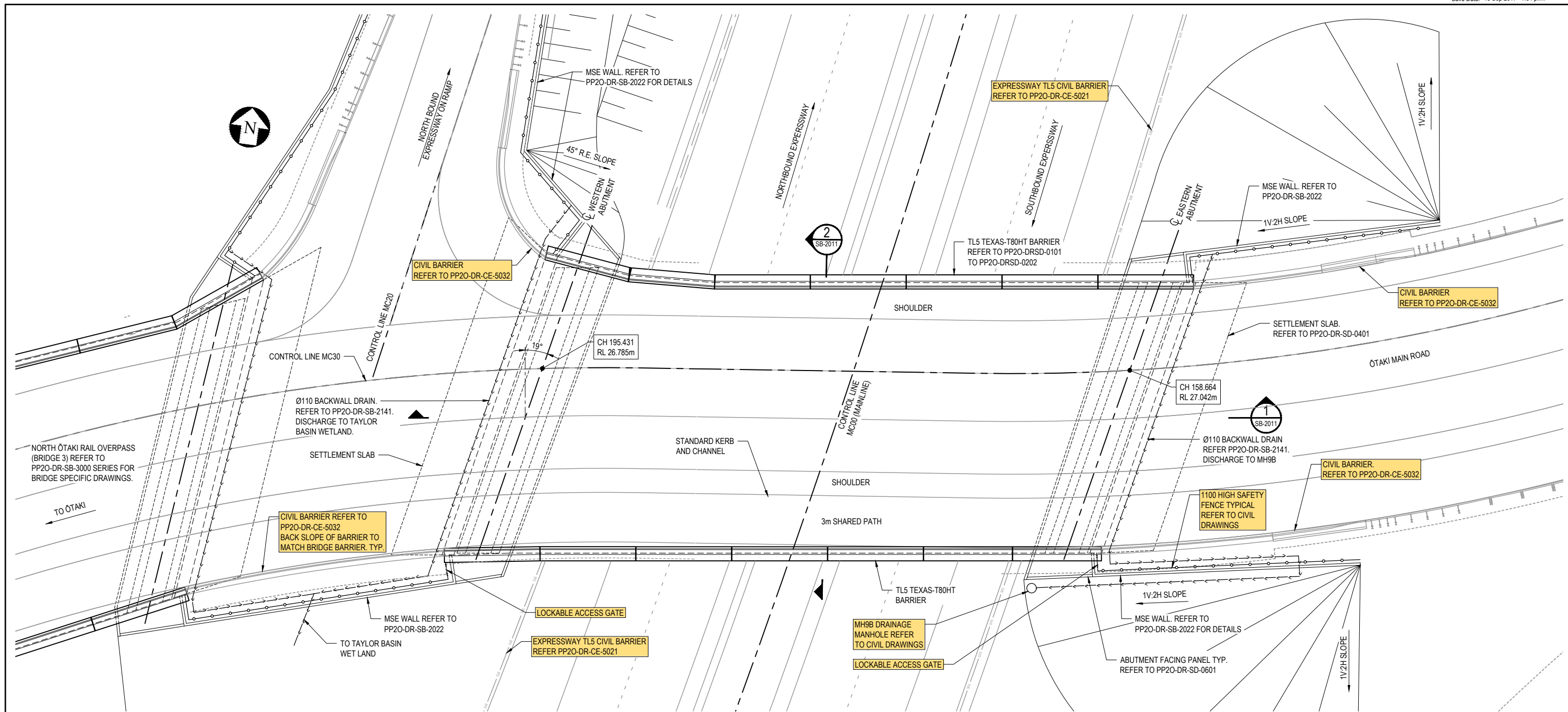
* Refer to Original Handcopy for Signature

Peka Peka to Ōtaki Expressway

Subject:	NORTH ŌTAKI MAIN ROAD UNDERPASS (BRIDGE 2)
Title:	STRUCTURAL DRAWINGS COVER SHEET AND DRAWING LIST

**FOR INFORMATION
NOT FOR CONSTRUCTION**

Discipline:	STRUCTURAL
Drawing No.:	PP20-DR-SB-2000
Rev.:	C



GENERAL ARRANGEMENT PLAN
SCALE 1:125

NOTES:

1. REFERENCES
 - 1.1. REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
 - 1.2. REFER TO RELEVANT CIVIL DRAWINGS FOR CONTROL LINES, ROADING GEOMETRY, BARRIER EXTENTS, LANE WIDTHS ETC.
 - 1.3. REFER TO RELEVANT CIVIL DRAWINGS FOR LOCATION OF UTILITIES AND SERVICES.
 - 1.4. ALL LEVELS GIVEN ARE TO STRUCTURAL SURFACE UNO.
2. DESIGN STANDARDS
 - 2.1. NZTA BRIDGE MANUAL, 3rd EDITION (2013), WITH PROJECT SPECIFIC AMENDMENTS.
 - 2.2. NZS 3101:2006 CONCRETE STRUCTURES STANDARD WITH PROJECT SPECIFIC AMENDMENTS.
 - 2.3. REFER TO DESIGN STATEMENT REPORT FOR FURTHER DETAILS.
3. DESIGN LOADING
 - 3.1. SUPERIMPOSED DEAD LOAD ALLOWANCE:
 - a) SURFACING = 2.0kPa (INCLUDING 0.5kPa FOR LEVELLING COURSE)
 - b) SERVICES = ALLOWANCES ARE MADE AS FOLLOWS:
 - i) 2 No Ø100mm TELECOMMUNICATIONS DUCT
 - ii) 2 No Ø200mm DUCTS FOR FUTURE SERVICES
 - iii) ADDITIONAL UNIFORMLY DISTRIBUTED LOAD APPLIED OVER ENTIRE DECK AREA OF 0.25kPa
 - 3.2. TRAFFIC LOAD HN-HO-72.
 - 3.3. SEISMIC LOAD BASED ON:
 - a) SUBSOIL CLASS D
 - b) ULS AEP (1/2500)
 - c) ULS DESIGN PGA 0.567g
 - 3.4. TEMPERATURE AND DIFFERENTIAL TEMPERATURE AS PER NZTA BRIDGE MANUAL.
 - 3.5. CREEP AND SHRINKAGE BASED ON AS3600 AND NZTA BRIDGE MANUAL 3rd EDITION FOR RELATIVE HUMIDITY 80%.
- 3.6. JACKING OF BRIDGE DECK FOR BEARING/ HORIZONTAL RESTRAINT REPLACEMENT. THE DESIGN INCLUDES THE FOLLOWING REQUIREMENTS:
 - a) TRAFFIC SHALL BE RESTRICTED TO 40km/h.
 - b) SEE ABUTMENT DRAWINGS FOR JACKING LOCATIONS AND LOADS.
 - c) JACKING LOADS ARE BASED ON HN LOADINGS
 - d) ALL JACKS AT EACH ABUTMENT SHALL BE HYDRAULICALLY LINKED AND HAVE A CENTRAL MECHANISM TO ENSURE THAT THE SAME VERTICAL DISPLACEMENTS OCCUR AT EACH JACKING POINT AT ALL TIMES DURING THE JACKING OPERATION.
 - e) BRIDGE BEARINGS ARE DESIGNED SHALL BE REPLACED USING LIFTS OF NOT GREATER THAN 10mm.
 - f) STEEL PLATES SHALL BE PLACED BETWEEN CONCRETE BEARING SURFACE AND HYDRAULIC JACK.
 - g) MAXIMUM ALLOWABLE CONTACT PRESSURE BETWEEN CONCRETE SURFACE AND STEEL PLATE SHALL BE 25MPa.
 - h) HORIZONTAL RESTRAINTS AT ABUTMENTS SHALL BE MAINTAINED.
4. DRAWING LIST
 - 4.1. FOR THE LIST OF ALL DRAWINGS APPLICABLE TO THIS BRIDGE, REFER TO DRG. SB-2000.
5. SPECIFICATIONS APPLICABLE TO THIS BRIDGE:
 - 5.1. C0203 - BULK EARTHWORKS
 - 5.2. C0600 - REINFORCED CONCRETE SUPPLY
 - 5.3. C0601 - REINFORCED CONCRETE CONSTRUCTION
 - 5.4. C0607 - PRE-STRESSED CONCRETE ELEMENTS
 - 5.5. C0614 - CONCRETE STAIN AND ANTI-GRAFFITI COATING
 - 5.6. C0700 - STRUCTURAL STEELWORK
6. CONSTRUCTION LOADS
 - 6.1. BRIDGE BEAMS ARE DESIGNED FOR CONSTRUCTION LIVE LOAD OF 1.5kPa. TEMPORARY WORK SHALL BE ADEQUATE FOR 1/500 APE (R = 1.0) SEISMIC AND WIND LOADING.
7. STRUCTURAL ELEMENTS INCLUDED IN PACKAGE:
 - 7.1. ABUTMENTS, APPROACH SLABS, PRE-STRESSED BEAMS, BEARINGS, TL5 TEXAS - T80HT BARRIERS WITH FASCIA, BACK WALL, MSE WALLS WITH METAL STRIPS.
 - 7.2. TRAFFIC BARRIERS DETAILED IN THE STRUCTURAL DRAWINGS TERMINATE AT THE EXTENT OF THE BRIDGE (BARRIERS BEYOND THAT ARE CONSIDERED TO BE STANDARD ROAD TRAFFIC BARRIERS. FOR THESE REFER TO THE RELEVANT CIVIL DRAWINGS).
8. COATING FOR EXPOSED CONCRETE SURFACES:
 - 8.1. GRAFFITI SOLUTION (OR EQUIVALENT APPROVED BY THE DESIGNER) SHALL BE APPLIED TO THE EXPOSED CONCRETE SURFACES.
 - 8.2. FOR THE APPLICATION OF SURFACE COATING, PLEASE REFER TO THE SPECIFICATION C0614.
 - 8.3. THE FOLLOWING TABLE SUMMARISES THE EXTENT OF COATINGS TO CONCRETE SURFACES.

TABLE 1. CONCRETE SURFACE COATINGS

BRIDGE ELEMENTS	EXPOSED SURFACE	ANTI-GRAFFITI COATING
BRIDGE BARRIER	INSIDE FACES, FACING OTAKI MAIN ROAD	YES
	TOP SURFACE & OUTER FACE (FASCIA)	YES
ABUTMENTS	FRONT FACES (FACING EXPRESSWAY)	YES
	SIDES OF ABUTMENTS	YES
DECK SOFFIT	1.5m HORIZONTALLY FROM AN ACCESSIBLE SUBSTRUCTURE ELEMENT	YES

9. CONSTRUCTION SEQUENCE:

TABLE 2. CONSTRUCTION SEQUENCE

SEQUENCE	ACTIVITY
0	CONSTRUCT TEMPORARY WORKS TO SUPPORT EXISTING SH1.
1	EXCAVATE TO BASE OF FORMATION LEVEL. UNDERCUT AND REPLACE UNSUITABLE MATERIAL.
2	INSTALL STORMWATER PIPE AT EXPRESSWAY SHOULDER AND BACKFILL PRIOR TO EXCAVATION FOR MSE WALL.
3	INSTALL SETTLEMENT PLATES.
4	CONSTRUCT SUBSOIL DRAIN, MSE WALLS AND APPROACH EMBANKMENTS AND INSTALL SETTLEMENT STATION.
5	MINIMUM 1 MONTH CONSTRUCTION HOLD MONITOR SETTLEMENTS. DESIGNER TO CONFIRM REMAINING SETTLEMENT IS ACCEPTABLE PRIOR TO BRIDGE CONSTRUCTION.
6	CONSTRUCT ABUTMENT BANK SEAT WITH SETTLEMENT PINS.
7	INSTALL PRECAST SUPER T BEAMS AND BEARINGS.
8	CAST ABUTMENT BACKWALL.
9	COMPLETE BRIDGE DECK.
10	BACKFILL UP TO SETTLEMENT SLAB AT BOTH ABUTMENTS.
11	INSTALL SETTLEMENT SLABS.
12	COMPLETE BACKFILL ADJACENT TO ABUTMENT BACKWALLS AT BOTH ABUTMENT.
13	PLACE BARRIER AND POUR STITCH, AND INSTALL TOP RAILS.
14	MONITOR SETTLEMENT OF BRIDGE ABUTMENTS AND APPROACH EMBANKMENTS.
15	COMPLETE BRIDGE PAVEMENT, APPROACH EMBANKMENT PAVEMENT AND ANCILLARY ITEMS.
16	INSTALL UTILITIES TO THE BRIDGE AND RELOCATE TRAFFIC.

THE ABOVE CONSTRUCTION SEQUENCE SHOWS THE SEQUENCING AS ASSUMED FOR DESIGN PURPOSES. CONSTRUCTOR TO ADVISE DESIGNER IF ALTERNATIVE CONSTRUCTION SEQUENCE IS PROPOSED.

**FOR INFORMATION
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
C	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
B	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17
A	30% DESIGN REVIEW	MAJ	ARK	JK	10.04.17

Scale (A1)	Design	A.KIVELL	10.04.17	Approved For Construction
Scale (A3) <td>Drawn</td> <td>C.BURKE</td> <td>09.03.17</td> <td></td>	Drawn	C.BURKE	09.03.17	
	Desg Verifier	G.BROWN	07.09.17	
	Desg Check	B.FLYNN		

NZ TRANSPORT AGENCY | **Peka Peka to Ōtaki Expressway** | **Fletcher HIGGINS** | **BECA** | **Tonkin+Taylor**

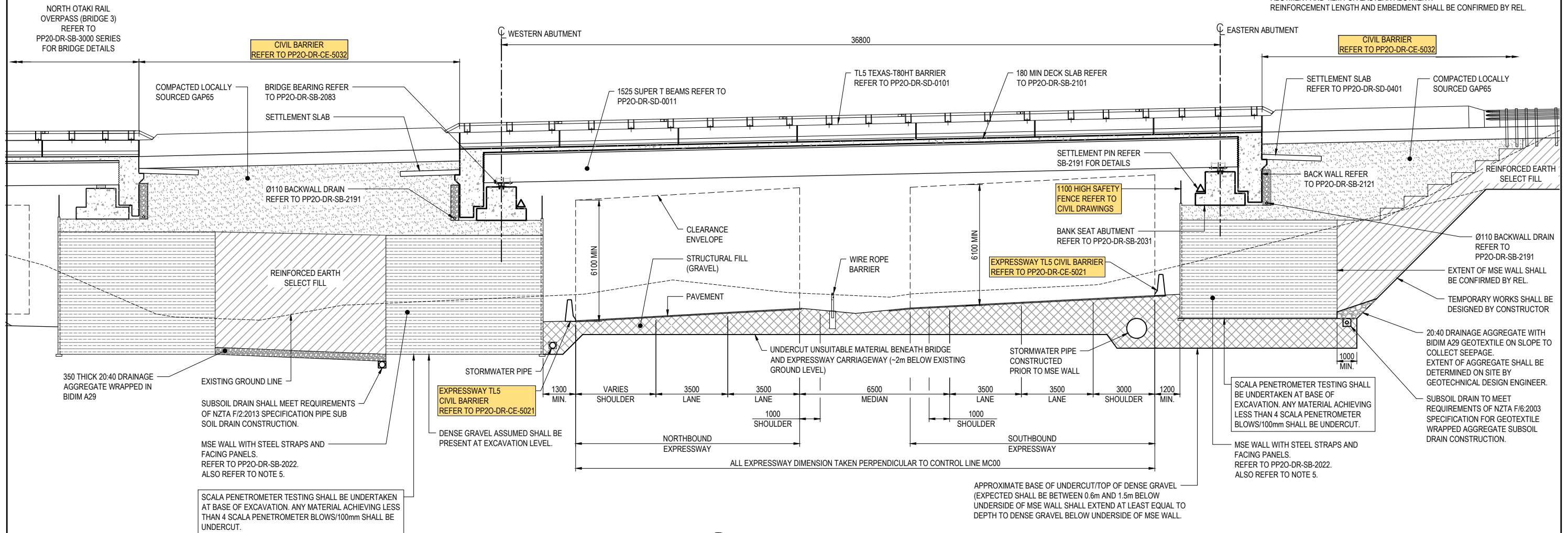
Subject:	NORTH ŌTAKI MAIN ROAD UNDERPASS (BRIDGE 2)
Title:	GENERAL ARRANGEMENT PLAN

Discipline:	STRUCTURAL
Drawing No.:	PP20-DR-SB-2001
Rev.:	C

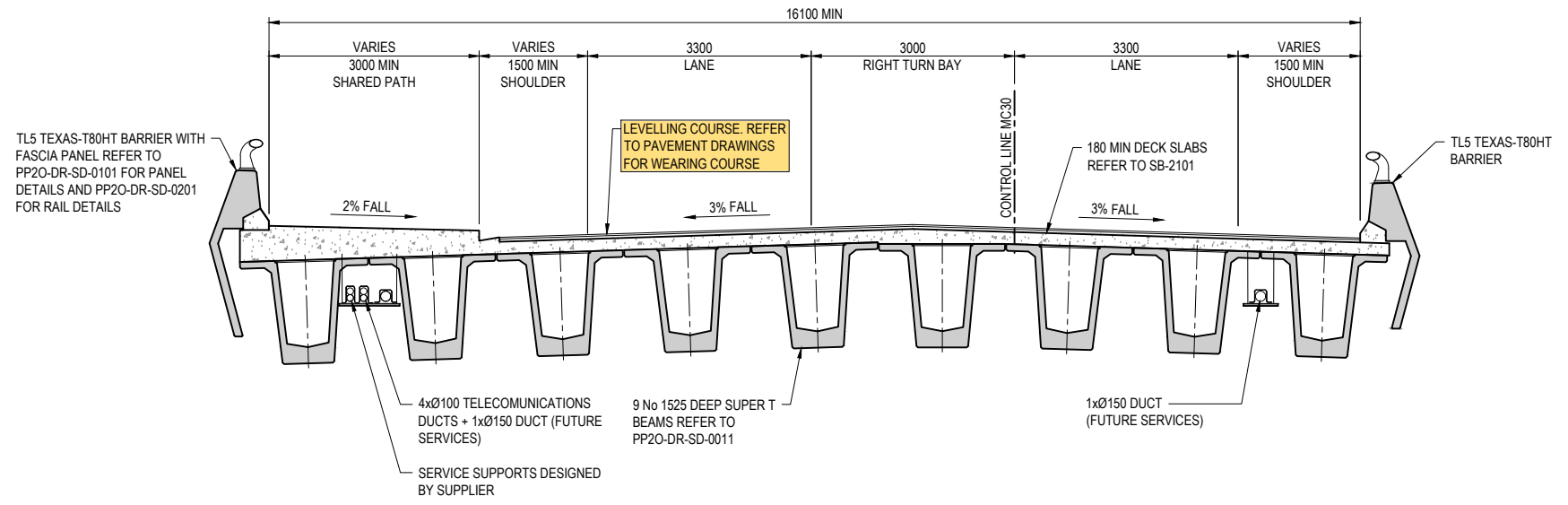
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NOTES:

1. REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
2. REFER TO PP20-DR-SB-2001 FOR BRIDGE SPECIFIC NOTES
3. THE SERVICES SUPPORT SHALL BE A UNISTRUT PROPRIETARY SYSTEM DESIGNED BY THE SUPPLIER.
4. THE SUPPLIER SHALL PROVIDE THE FIXING REQUIREMENTS FOR THE SERVICES SUPPORT SYSTEM TO CAST IN TO THE DECK SLAB.
5. MSE WALLS SHALL BE DESIGNED BY REINFORCED EARTH LTD (REL). MINIMUM REINFORCEMENT LENGTH OF 6.7m FOR WESTERN ABUTMENT AND 8.0m FOR EASTERN ABUTMENT. MINIMUM EMBEDMENT BELOW FINISHED GROUND LEVEL OF 1.0m FOR WESTERN ABUTMENT AND 1.2m FOR EASTERN ABUTMENT. REINFORCEMENT LENGTH AND EMBEDMENT SHALL BE CONFIRMED BY REL.



1 LONGITUDINAL SECTION
SB-2001 SCALE 1:100



2 TYPICAL CROSS SECTION
SB-2001 SCALE 1:50

**FOR INFORMATION
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
C	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
B	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17
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Scale (A1) AS SHOWN	Design	A.KIVELL	10.04.17	Approved For Construction
Scale (A3)	Drawn	C.BURKE	09.03.17	
	Desg Verifier	G.BROWN	07.09.17	
	Desg Check	B.FLYNN		

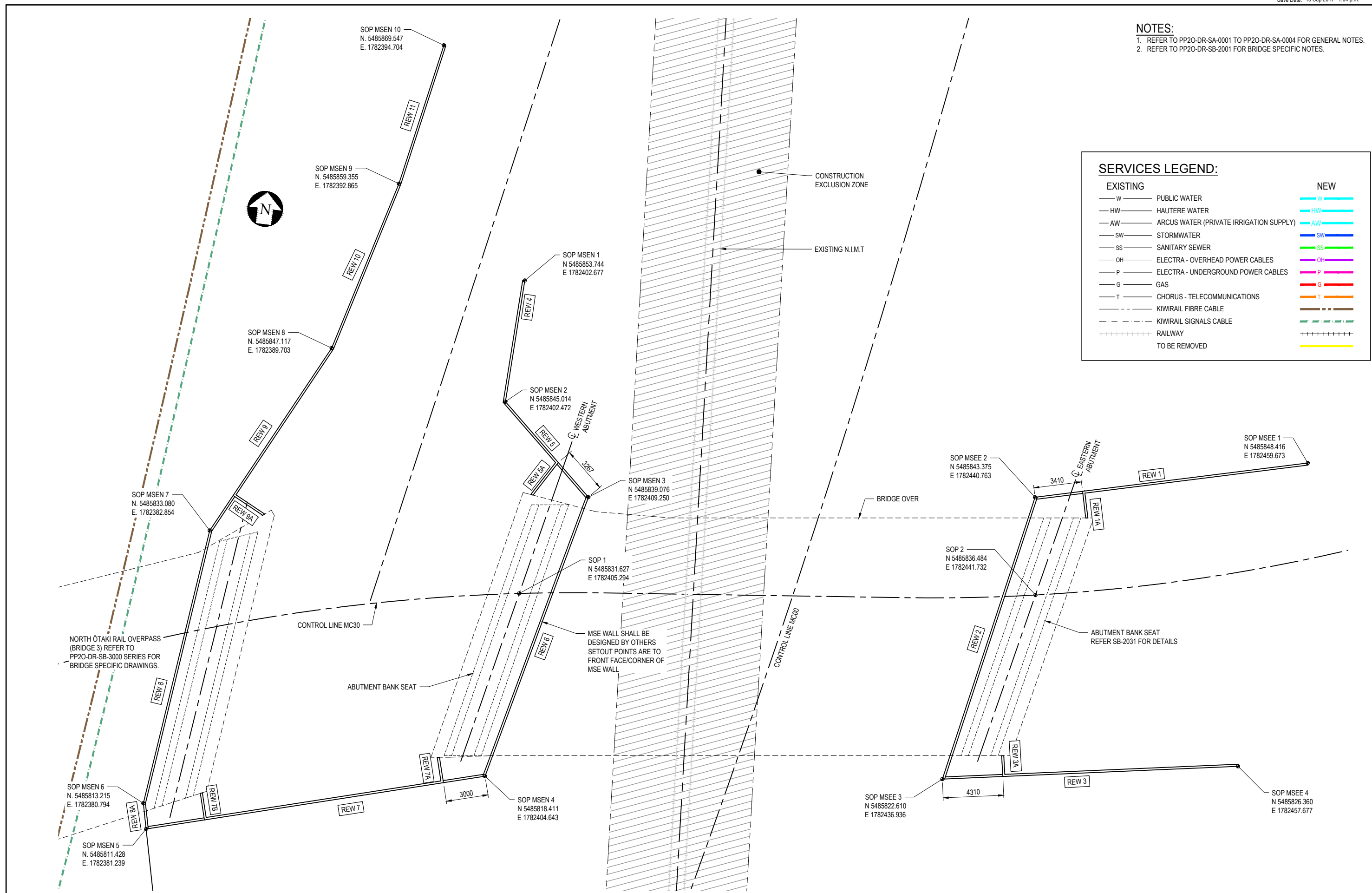
NZ TRANSPORT AGENCY **Peka Peka to Ōtaki Expressway** **Fletcher HIGGINS** **BECA** **Tonkin+Taylor**

Subject:	NORTH ŌTAKI MAIN ROAD UNDERPASS (BRIDGE 2)	Discipline:	STRUCTURAL
Title:	GENERAL ARRANGEMENT SECTIONS	Drawing No.:	PP20-DR-SB-2011
		Rev.:	C

- NOTES:**
- REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
 - REFER TO PP20-DR-SB-2001 FOR BRIDGE SPECIFIC NOTES.

SERVICES LEGEND:

EXISTING	NEW
— W — PUBLIC WATER	— W —
— HW — HAUTERE WATER	— HW —
— AW — ARCUS WATER (PRIVATE IRRIGATION SUPPLY)	— AW —
— SW — STORMWATER	— SW —
— SS — SANITARY SEWER	— SS —
— OH — ELECTRA - OVERHEAD POWER CABLES	— OH —
— P — ELECTRA - UNDERGROUND POWER CABLES	— P —
— G — GAS	— G —
— T — CHORUS - TELECOMMUNICATIONS	— T —
— — KIWIRAIL FIBRE CABLE	— —
— — KIWIRAIL SIGNALS CABLE	— —
— + — RAILWAY	— + —
— — TO BE REMOVED	— —



SUBSTRUCTURE SETOUT PLAN
SCALE 1:125

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
C	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
B	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17
A	30% DESIGN REVIEW	MAJ	ARK	JK	10.04.17

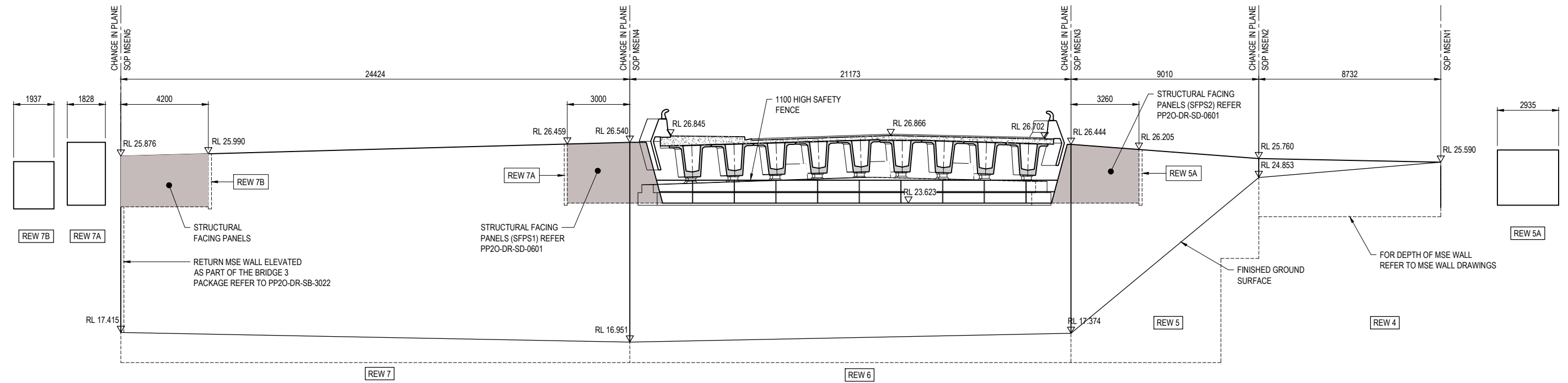
Scale (A1)	Design	Drawn	Checked	Approved For Construction
AS SHOWN	A.KIVELL	C.BURKE	G.BROWN	10.04.17
Scale (A3)			B.FLYNN	10.03.17
				07.09.17

NZ TRANSPORT AGENCY | **Peka Peka to Otaki Expressway** | **Fletcher HIGGINS** | **BECA** | **Tonkin+Taylor**

Subject:	NORTH OTAKI MAIN ROAD UNDERPASS (BRIDGE 2)
Title:	GENERAL ARRANGEMENT SUBSTRUCTURE SETOUT PLAN

Discipline:	STRUCTURAL
Drawing No.:	PP20-DR-SB-2021
Rev.:	C

- NOTES:**
 1. REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
 2. REFER TO PP20-DR-SB-2001 FOR BRIDGE SPECIFIC NOTES.

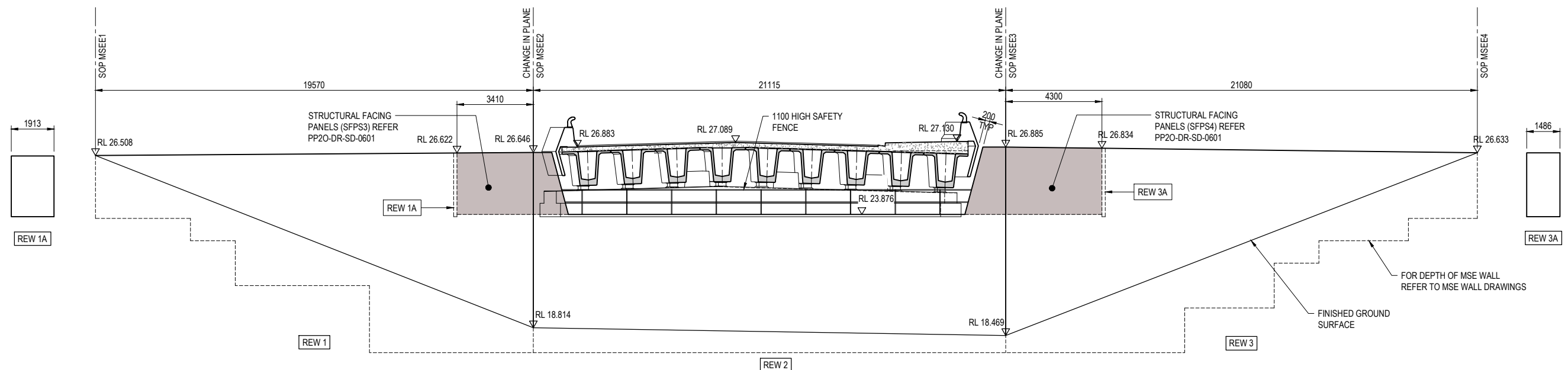


WESTERN ABUTMENT MSE WALL ELEVATION
 SCALE 1:100

TABLE 1. STRUCTURAL FACING PANEL DIMENSIONS

PANEL	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G'
SFPS1	790	1575	2918	2820	2836	403	119°
SFPS2	178	937	2830	3080	2582	380	119°
SFPS3	826	1568	2770	3230	2746	429	115°
SFPS4	1031	1825	3009	4120	2957	396	108°

REFER PP20-DR-SD-0601



EASTERN ABUTMENT MSE WALL ELEVATION
 SCALE 1:100

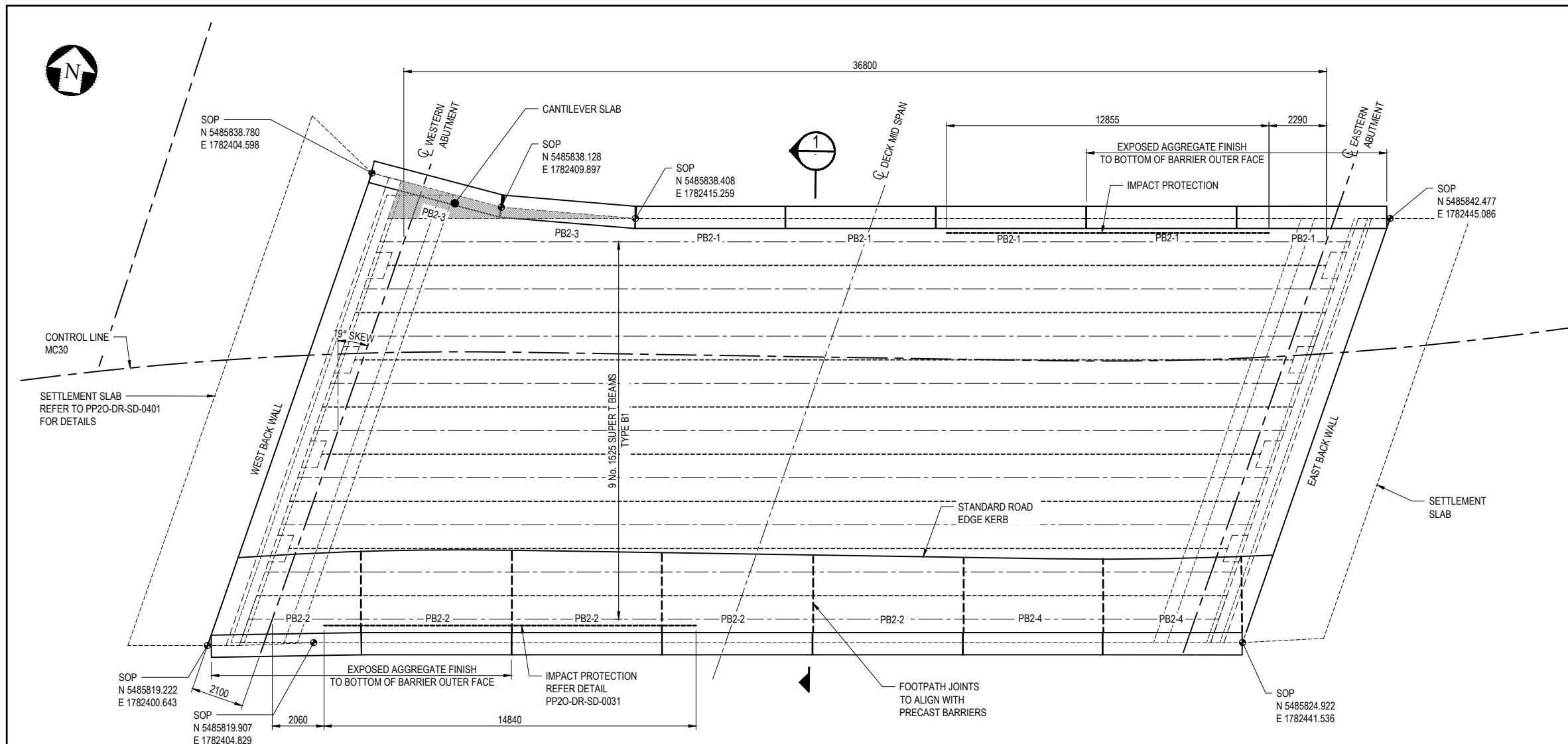
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	G.BROWN	07.09.17	B.FLYNN

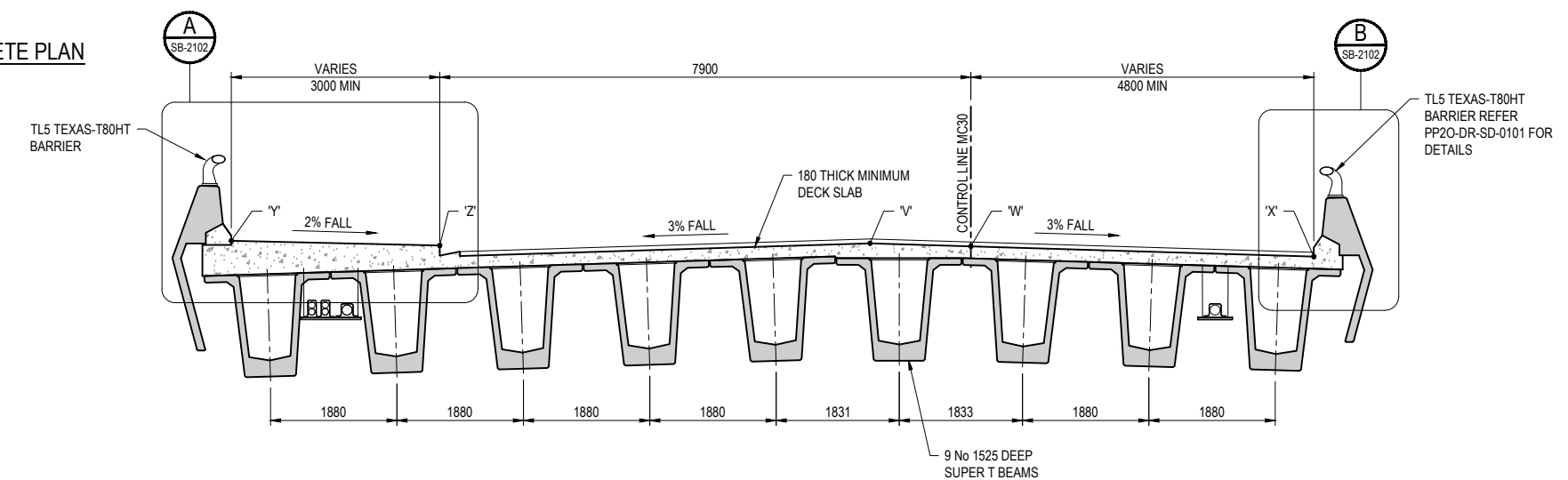
NZ TRANSPORT AGENCY **Peka Peka to Ōtaki Expressway** **Fletcher HIGGINS** **BECA** **Tonkin+Taylor**

Subject:	NORTH ŌTAKI MAIN ROAD UNDERPASS (BRIDGE 2)	Discipline:	STRUCTURAL
Title:	SUBSTRUCTURE DETAILS	Drawing No.:	PP20-DR-SB-2022
		Rev.:	B



SUPERSTRUCTURE CONCRETE PLAN

SCALE 1:100



1 TYPICAL CROSS SECTION

SCALE 1:50

NOTES:

- REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
- REFER TO PP20-DR-SB-2001 FOR BRIDGE SPECIFIC NOTES.
- REFER TO PP20-DR-SD-0010, SD-0011, SD-0013, SD-0014, SD-0015, SD-0016 AND SD-0031 FOR BEAM DETAILS.
- REFER TO PP20-DR-SD-0101 FOR PRECAST BARRIER DETAILS.
- FOR SUBSTRUCTURE SOP LOCATIONS REFER PP20-DR-SB-2021.
- NOMINAL GAP BETWEEN SUPER T BEAMS: 20mm.
- THE MIN. CONCRETE STRENGTH AT STRESS TRANSFER IS 37MPa.
- ESTIMATED HOG OF THE BEAM IS BASED ON THE FOLLOWING ASSUMPTIONS:
 - DENSITY OF CONCRETE = 2500kg/m³
 - ELASTIC MODULUS OF TRANSFER = 26540 MPa
 - NO LOADS EXCEPT BEAM SELF-WEIGHT.
 - STORAGE IN OPEN AIR (AFTER ELEVATED CURING) AT 20°C.
- UPWARD DEFLECTION OF BEAMS IS GIVEN IN THE BEAM HOG TABLE. THESE ARE ESTIMATED ONLY. ACTUAL DEFLECTIONS WILL BE DIFFERENT TO THOSE TABULATED AND WILL BE DIFFERENT FOR EACH BEAM. THE CONSTRUCTOR IS TO BE AWARE OF THE RISK OF DIFFERENTIAL HOGGING BETWEEN ADJACENT BEAMS. ESTIMATES AT TRANSFER AND 100 DAYS ARE PROVIDED MAKING DUE ALLOWANCE FOR THE INCREASE IN HOG DUE TO CONCRETE CREEP UNDER SUSTAINED LOAD. IF ACTUAL MEASUREMENTS VARY BY ±10mm THIS WILL REQUIRE REVIEW BY THE DESIGNER.
- LENGTH OF BEAM IS THE REQUIRED LENGTH OF THE FINISHED PRODUCT. PRECASTER SHALL MAKE ALLOWANCE FOR AXIAL SHORTENING.
- BEAM INSTALLATION
 - THE DECK SHALL BE CONSTRUCTED TO THE FINISHED LEVELS PROVIDED ON THE CIVIL DRAWINGS.
 - PRECAST BEAM LEVELS HAVE BEEN SET BASED ON ACHIEVING A MIN SLAB THICKNESS OF 180mm MID-SPAN. ACTUAL BEAM HOGS SHALL BE MEASURED IMMEDIATELY PRIOR TO ERECTION AND THE BEAM SOFFIT LEVELS AT BEARINGS ADJUSTED ACCORDINGLY.
 - DECK LEVELS SHALL BE SET WITH UPWARD CAMBER AS SHOWN BELOW. THE CAMBER COMPENSATES FOR THE DOWNWARD DEFLECTION OF THE BEAM DUE TO THE MASS OF THE IN-SITU CONCRETE DECK, BARRIER AND ASPHALT.
 - THE HOG OF THE BEAMS PRECLUDE THEIR USE AS A DATUM FOR SETTING OUT DECK LEVELS.

TABLE 1. 1525 SUPER T BEAM GEOMETRY

TYPE	LENGTH 'L' (mm)	FLANGE WIDTH (mm)		END BLOCK (mm)		BEARING ϵ (mm)				SKEW ANGLE	REQ TYPE
		'W1'	'W2'	'A1'	'A2'	'B1'	'B2'	'C1'	'C2'		
B1	38700	1860		1500	1500	7100	7100	953	953	19°	R3

REFER NOTE 3

TABLE 2. PRECAST BARRIER LENGTHS

TYPE	LENGTH 'LB' (mm)	'B' (mm)
PB2-1	5980	2150
PB2-2	5980	2450
PB2-3	5390	2150
PB2-4	5555	2450

REFER NOTE 4

TABLE 3. ESTIMATED BEAM HOGS

KEY	DESCRIPTION	HOG (mm)
		ALL BEAMS
A1	ESTIMATE HOG BEAM AT TRANSFER	75
A2	ESTIMATE HOG AT 100 DAYS AFTER TRANSFER	110
B	ESTIMATE INSTANT AMENDED DEFLECTION AT CASTING OF TOP SLAB	50
C	PERMITTED MINIMUM TOP SLAB THICKNESS AT MID SPAN	180 +10/-0

SEE FIGURE 1

FIGURE 1

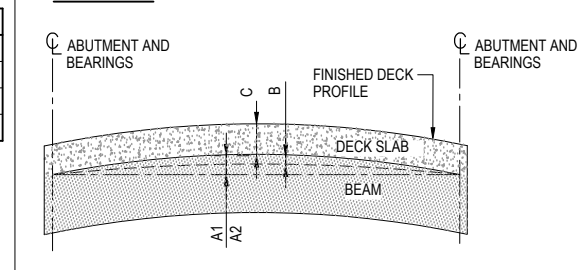


TABLE 4. ESTIMATED TOTAL SHORTENING OF BEAM SOFFIT

BEAMS	AT TRANSFER	AT 30 DAYS	AT 100 DAYS
ALL	20mm	50mm	70mm

THE ABOVE ESTIMATES INCLUDE BEAM END ROTATION. CONSTRUCTORS MAY NEED TO REVISE SHORTENING ESTIMATES BASED ON REVIEW OF ACTUAL SHORTENING OF THE FIRST BEAM POURED.

TABLE 5. DECK LEVELS

LOCATION	CHAINAGE	REDUCED LEVELS (m)				
		'V'	'W'	'X'	'Y'	'Z'
WEST END OF DECK	197.685	26.786	26.741	26.588	26.620	26.687
WEST BEARING LINE	195.431	26.830	26.785	26.632	26.664	26.731
EAST BEARING LINE	158.664	27.081	27.042	26.889	26.921	26.988
EAST END OF DECK	155.864	27.074	27.035	26.882	26.914	26.981

No.	Revision	By	Chk	Appd	Date
B	100% DESIGN REVIEW	MAJ	ARK	JK	14.09.17
A	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17

Scale (A1)	Design	Date	Approved For
AS SHOWN	A.KIVELL	10.04.17	Construction
Scale (A3)	M.JULIATON	12.04.17	
	G.BROWN	07.09.17	
	B.FLYNN		

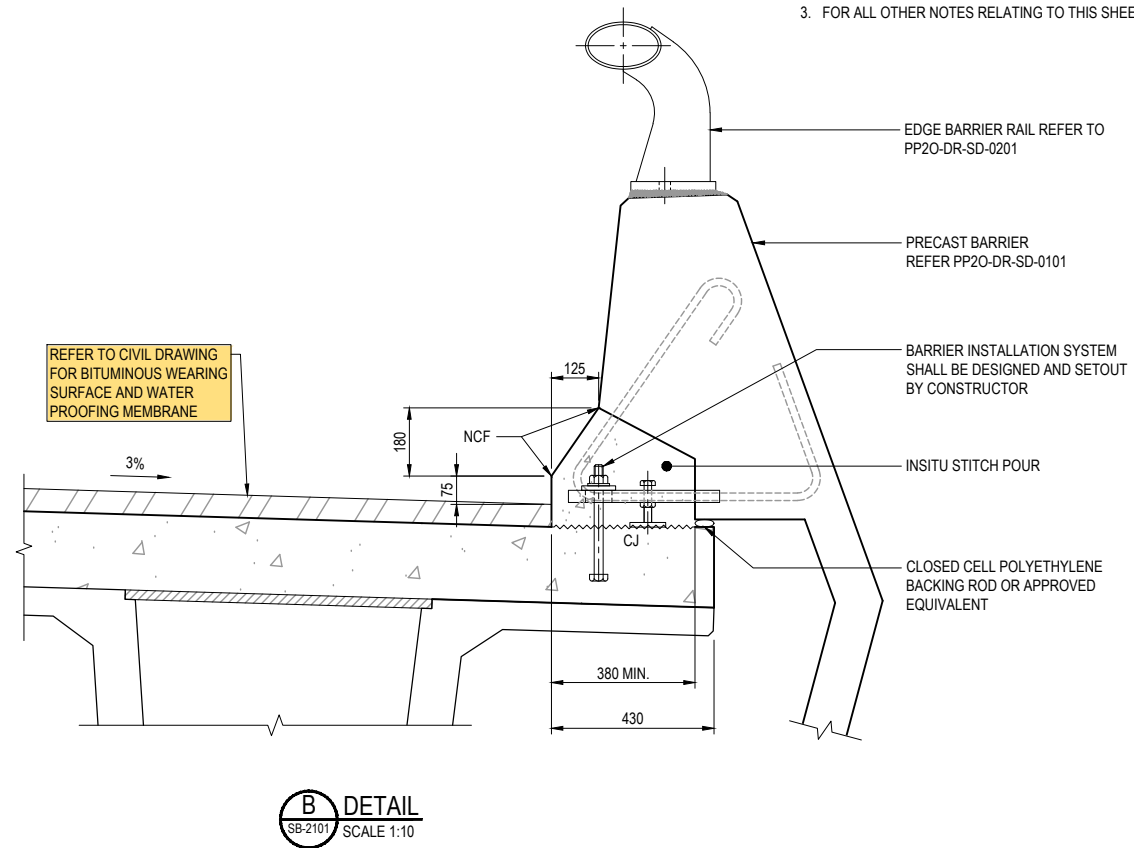
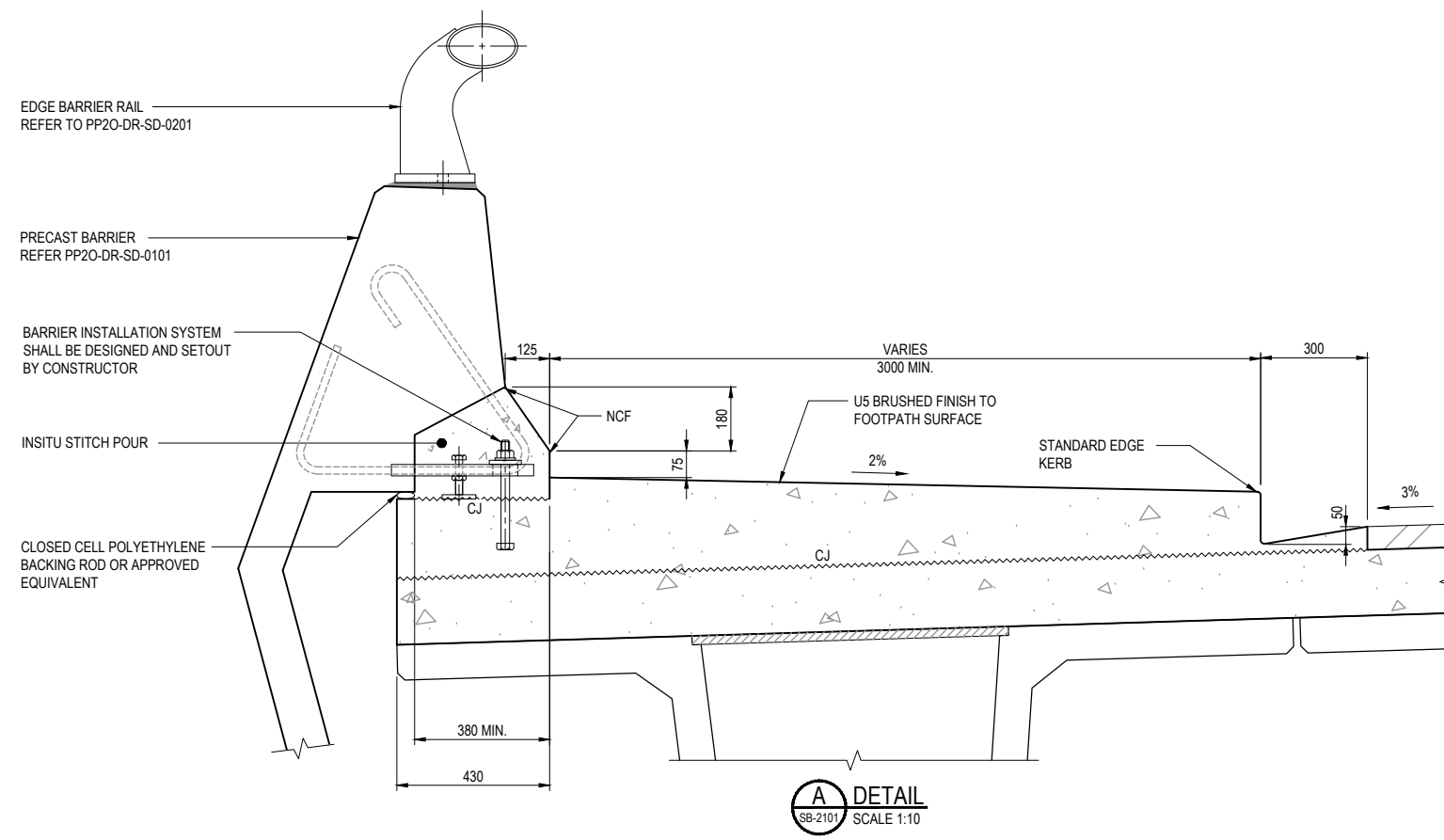


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BECA **Tonkin+Taylor**

Subject:	NORTH ŌTAKI MAIN ROAD UNDERPASS (BRIDGE 2)	Discipline:	STRUCTURAL
Title:	SUPERSTRUCTURE CONCRETE SHEET 1	Drawing No.:	PP20-DR-SB-2101
		Rev.:	B

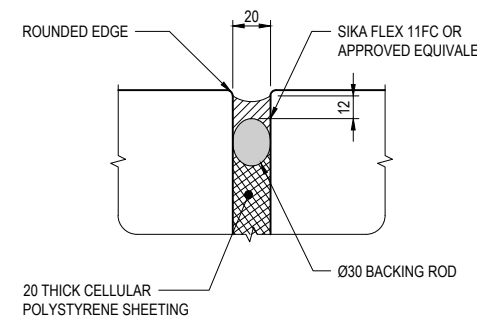
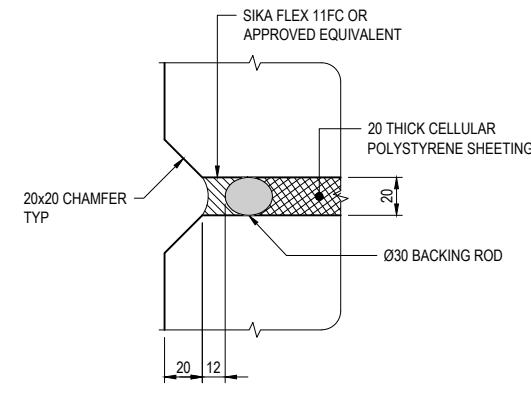
FOR INFORMATION NOT FOR CONSTRUCTION

- NOTES:**
1. REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
 2. REFER TO PP20-DR-SB-2001 FOR BRIDGE SPECIFIC NOTES.
 3. FOR ALL OTHER NOTES RELATING TO THIS SHEET REFER TO PP20-DR-SB-2101.



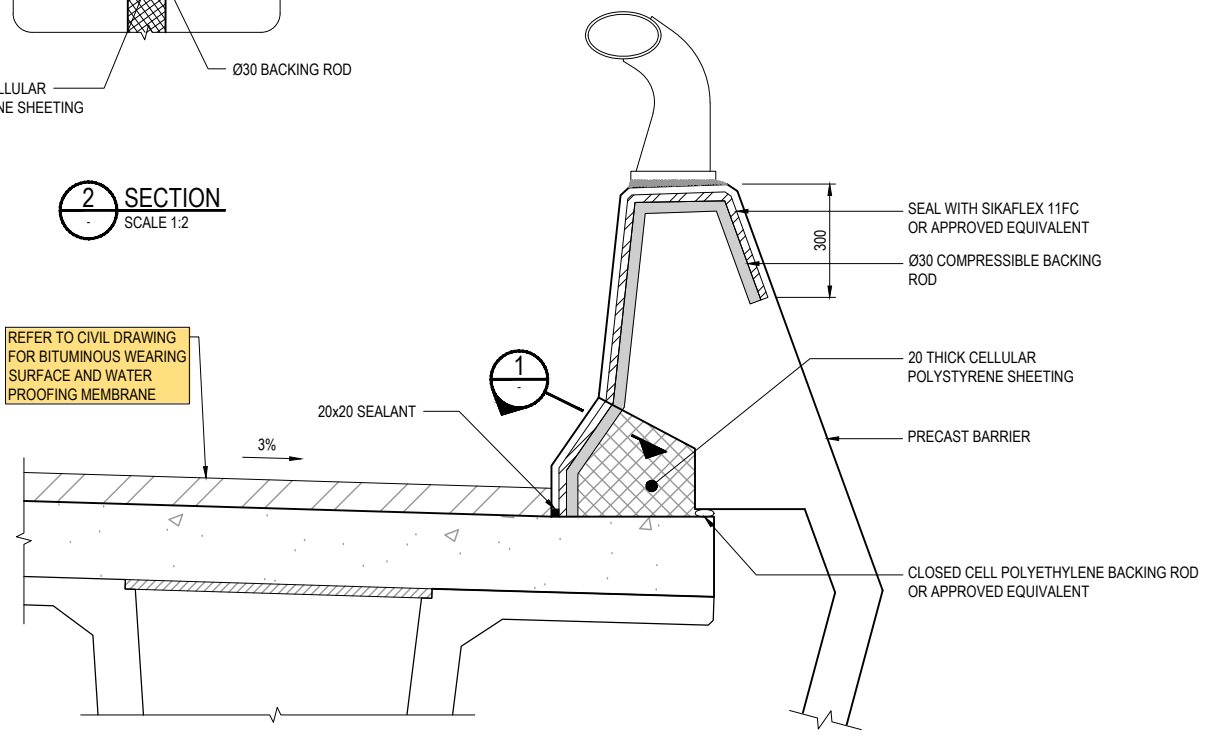
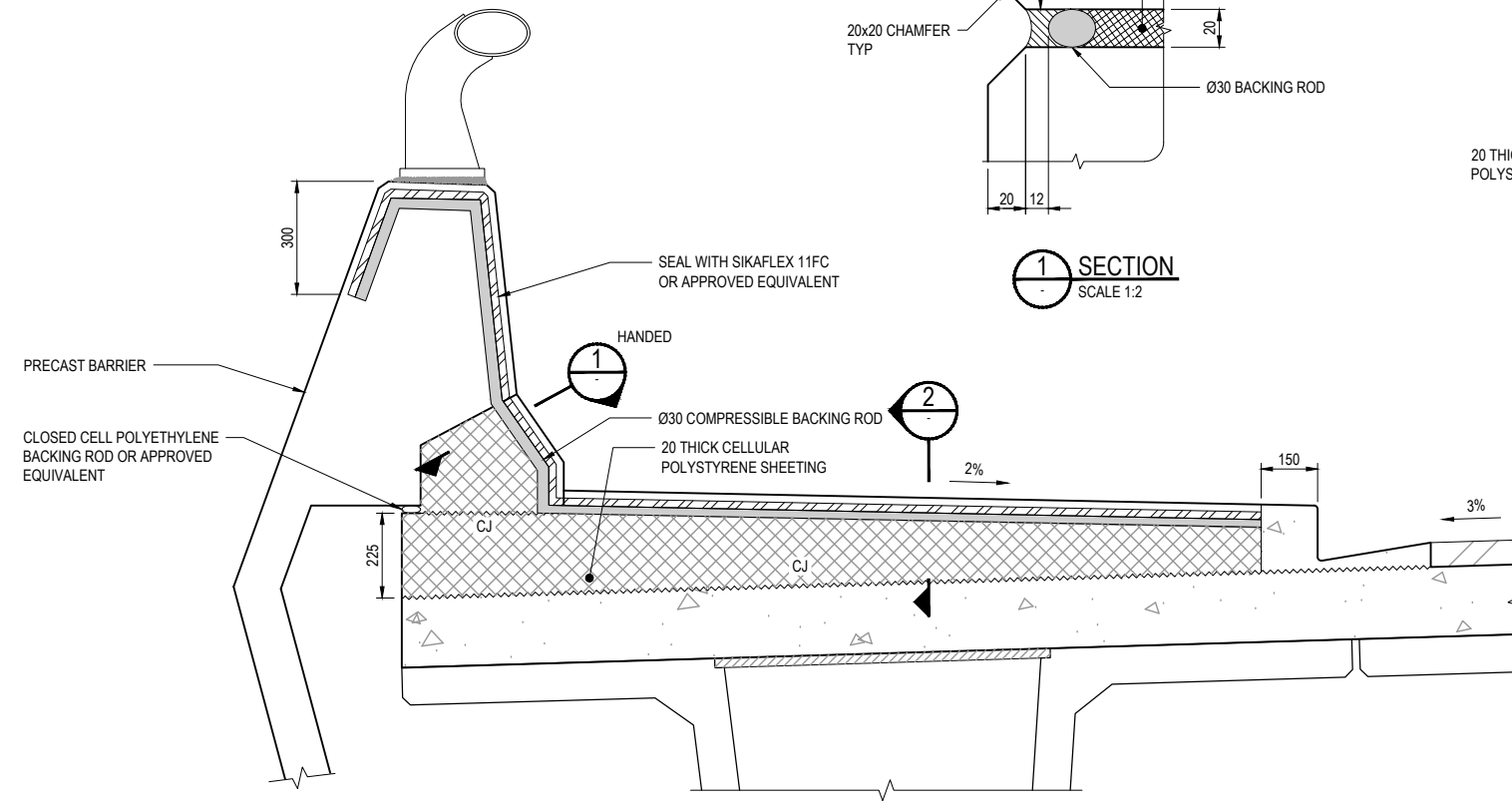
A DETAIL
SB-2101 SCALE 1:10

B DETAIL
SB-2101 SCALE 1:10



1 SECTION
SCALE 1:2

2 SECTION
SCALE 1:2



TYPICAL SECTION AT SHARED PATH BARRIER JOINT
SCALE 1:10

TYPICAL SECTION AT BARRIER JOINT
SCALE 1:10

**FOR INFORMATION
NOT FOR CONSTRUCTION**

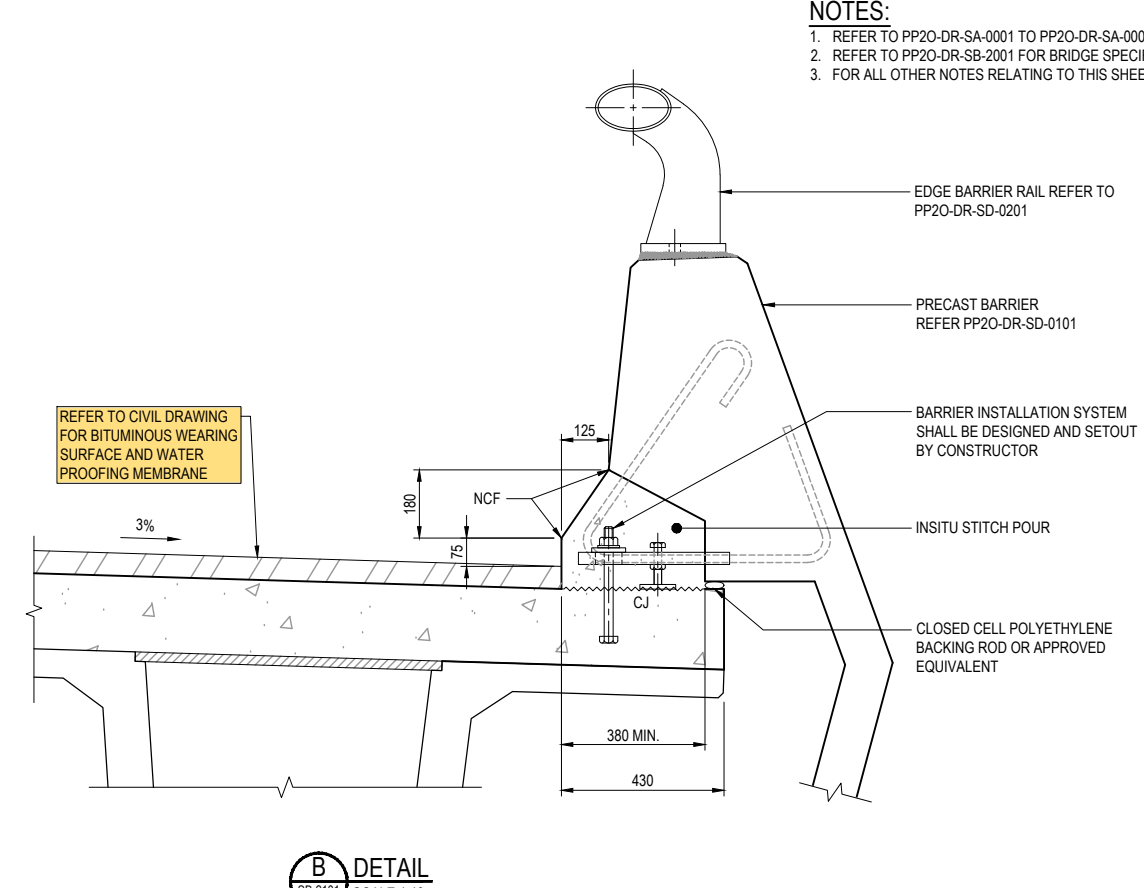
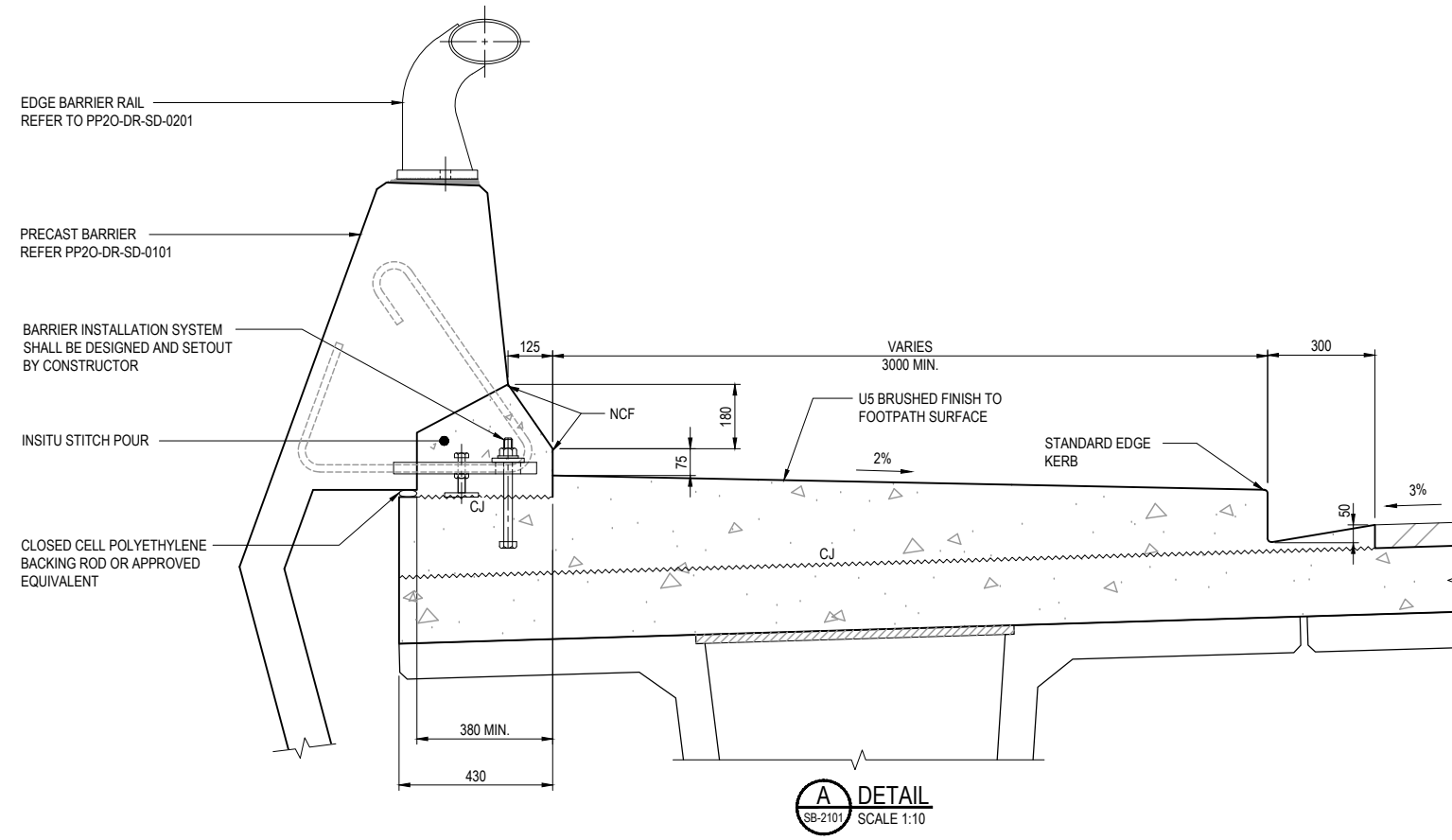
No.	Revision	By	Chk	Appd	Date
B	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
A	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17

Scale (A1)	Design	Date	Approved For
AS SHOWN	A.KIVELL	10.04.17	Construction
Scale (A3)	M.JULATON	13.04.17	
	G.BROWN	07.09.17	
	B.FLYNN		

Peka Peka to Ōtaki Expressway

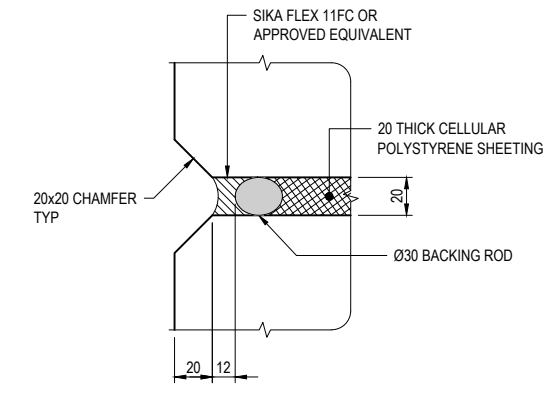
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Title:	SUPERSTRUCTURE CONCRETE SHEET 2	Drawing No.:	PP20-DR-SB-2102
		Rev.:	B

- NOTES:**
1. REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
 2. REFER TO PP20-DR-SB-2001 FOR BRIDGE SPECIFIC NOTES.
 3. FOR ALL OTHER NOTES RELATING TO THIS SHEET REFER TO PP20-DR-SB-2101.

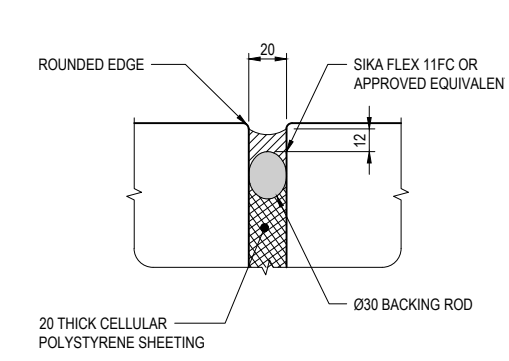


A DETAIL
SB-2101 SCALE 1:10

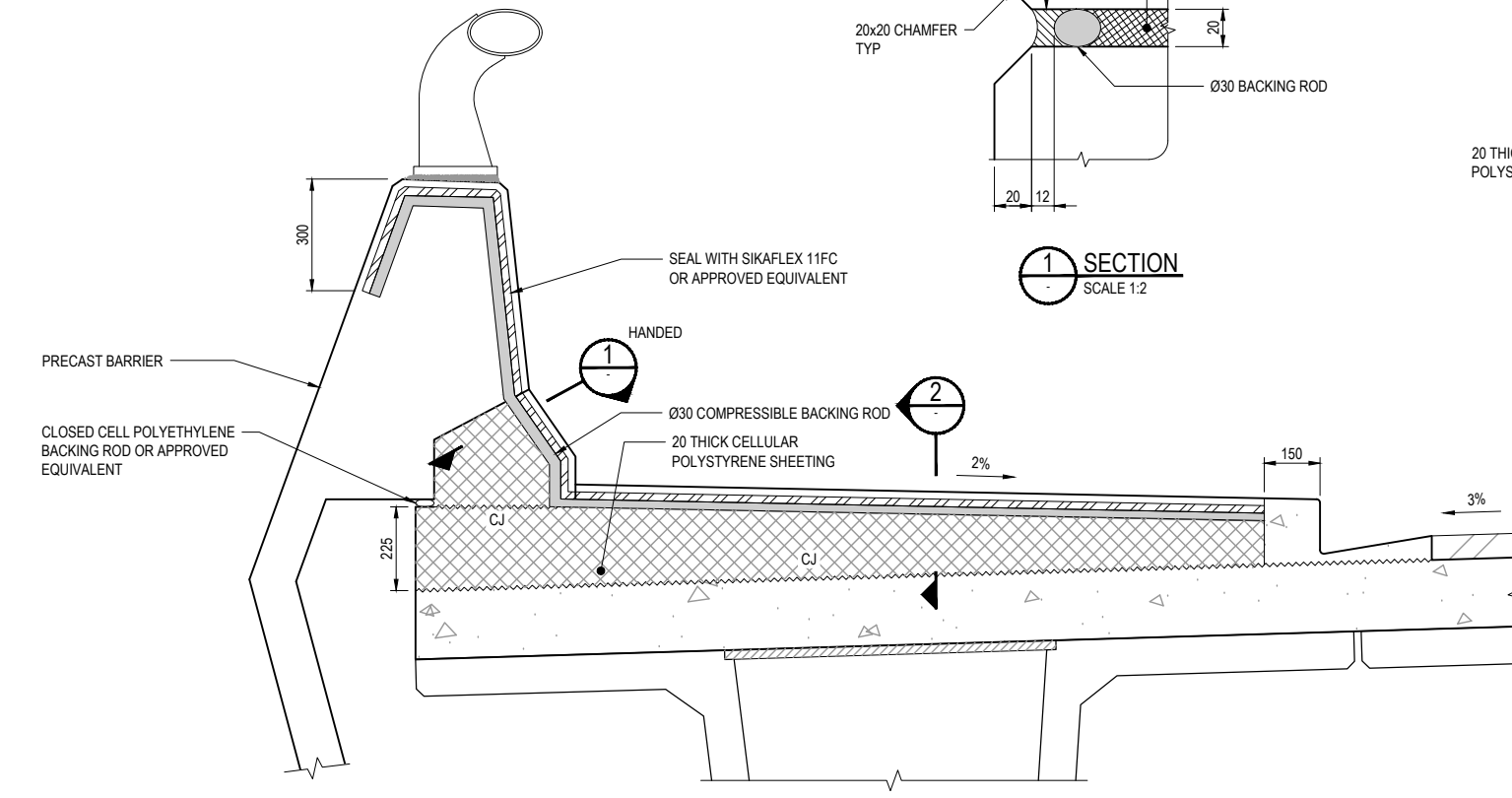
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SB-2101 SCALE 1:10



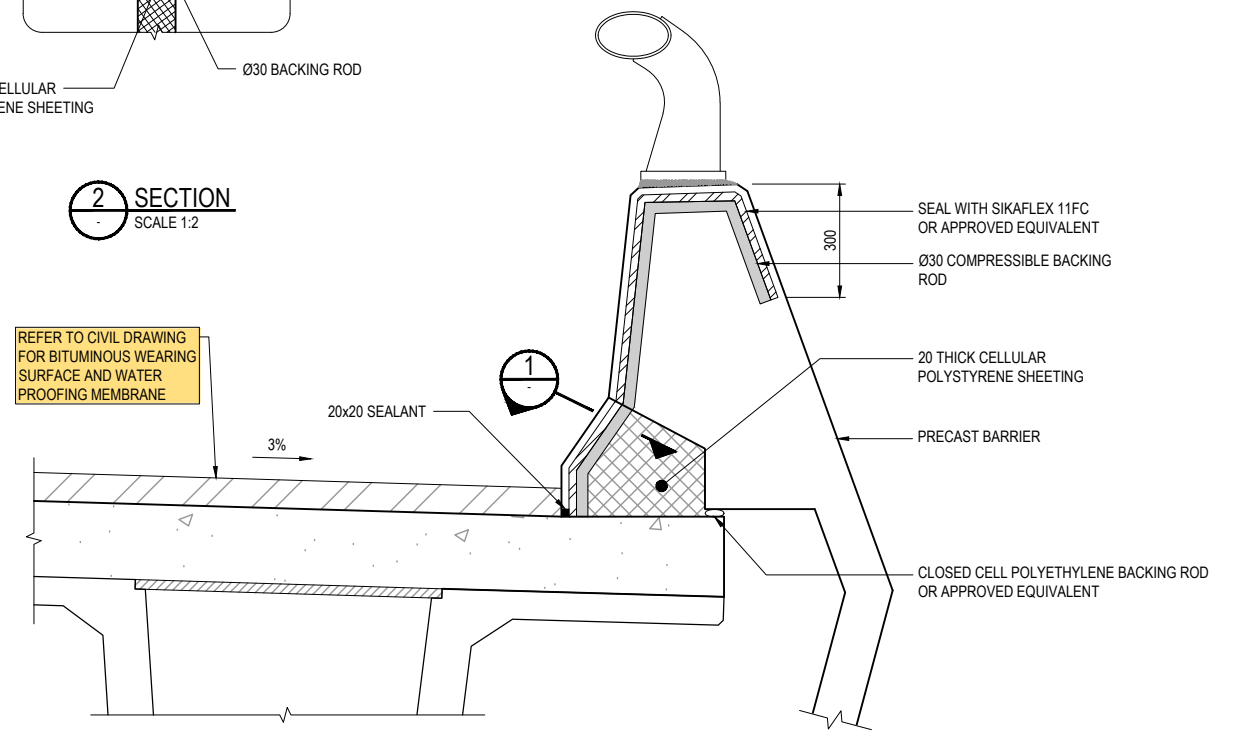
1 SECTION
SCALE 1:2



2 SECTION
SCALE 1:2



TYPICAL SECTION AT SHARED PATH BARRIER JOINT
SCALE 1:10



TYPICAL SECTION AT BARRIER JOINT
SCALE 1:10

**FOR INFORMATION
NOT FOR CONSTRUCTION**

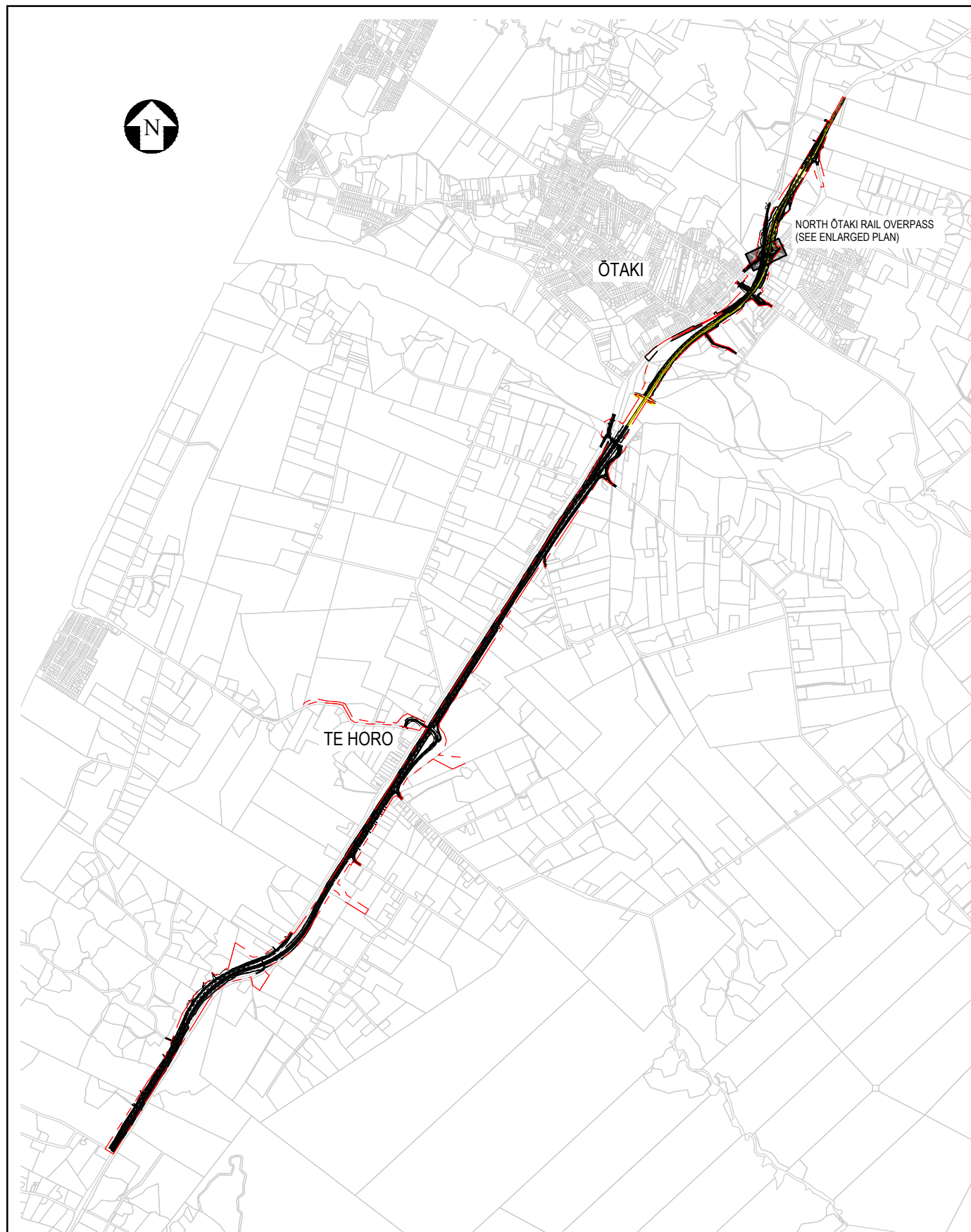
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A	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17

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	G.BROWN	07.09.17	
	B.FLYNN		

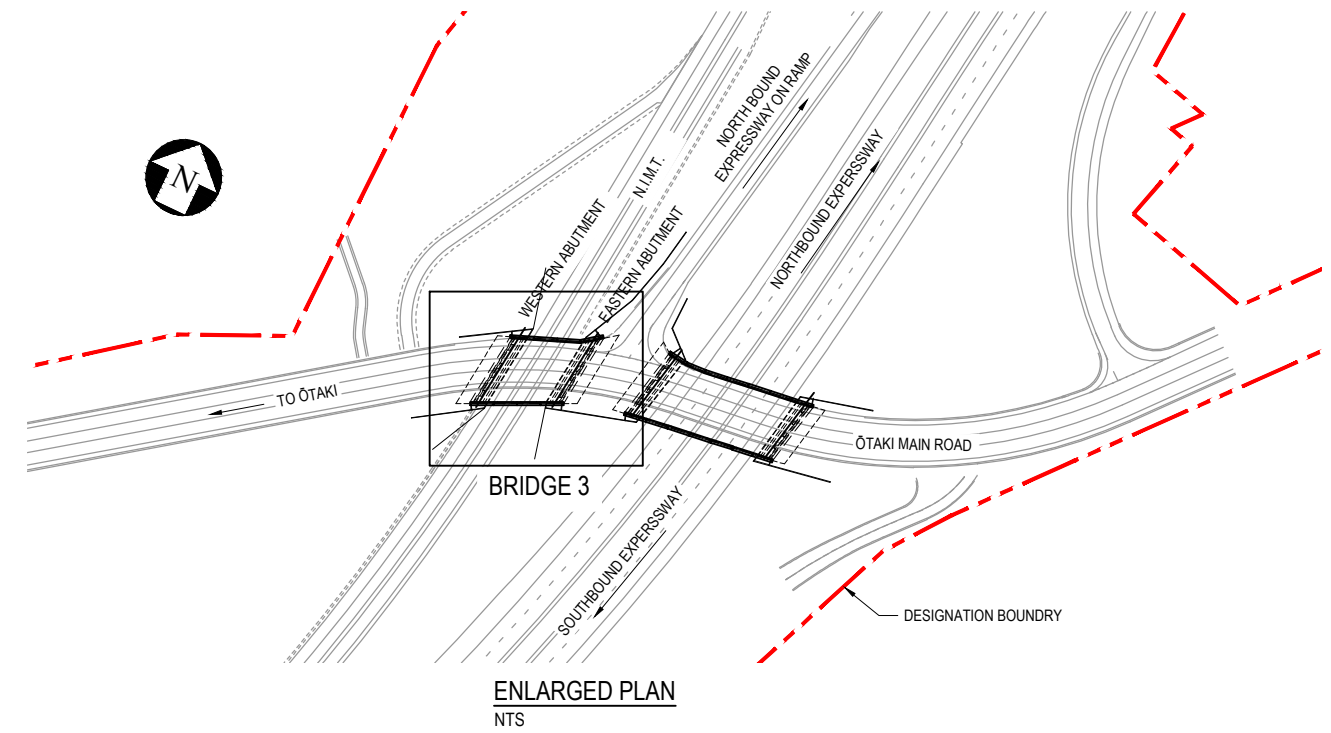
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Peka Peka to Ōtaki Expressway
 Fletcher HIGGINS
 BECA
 Tonkin+Taylor

Subject:	NORTH ŌTAKI MAIN ROAD UNDERPASS (BRIDGE 2)
Title:	SUPERSTRUCTURE CONCRETE SHEET 2

Discipline:	STRUCTURAL
Drawing No.:	PP20-DR-SB-2102
Rev.:	B



LOCATION PLAN
NTS



ENLARGED PLAN
NTS

STRUCTURAL DRAWING LIST

DRAWING NUMBER	DRAWING NAME	REVISION
GENERAL NOTES		
PP20-DR-SA-0001	GENERAL NOTES	B
PP20-DR-SA-0002	GENERAL NOTES - REINFORCED CONCRETE SHEET 1	B
PP20-DR-SA-0003	GENERAL NOTES - REINFORCED CONCRETE SHEET 2	B
PP20-DR-SA-0004	GENERAL NOTES - STRUCTURAL STEEL	C
PROJECT DRAWINGS		
PP20-DR-SB-3000	COVER SHEET AND DRAWING LIST	C
PP20-DR-SB-3001	GENERAL ARRANGEMENT PLAN	C
PP20-DR-SB-3011	GENERAL ARRANGEMENT SECTIONS	C
PP20-DR-SB-3021	SUBSTRUCTURE SETOUT PLAN	C
PP20-DR-SB-3022	SUBSTRUCTURE DETAILS	B
PP20-DR-SB-3031	ABUTMENT BANK SEAT CONCRETE	B
PP20-DR-SB-3041	ABUTMENT BANK SEAT REINFORCEMENT	B
PP20-DR-SB-3081	VERTICAL GUIDE BEARING DETAILS	B
PP20-DR-SB-3083	POT BEARING DETAILS	B
PP20-DR-SB-3101	SUPERSTRUCTURE CONCRETE SHEET 1	B
PP20-DR-SB-3102	SUPERSTRUCTURE CONCRETE SHEET 2	B
PP20-DR-SB-3121	BACK WALL CONCRETE	B
PP20-DR-SB-3125	BACK WALL REINFORCEMENT SHEET 1	B
PP20-DR-SB-3126	BACK WALL REINFORCEMENT SHEET 2	B
PP20-DR-SB-3161	DECK REINFORCEMENT	B
PP20-DR-SB-3191	EARTHWORKS, BACKFILLING, AND DRAINAGE	A

STRUCTURAL DRAWING LIST

DRAWING NUMBER	DRAWING NAME	REVISION
STANDARD DRAWINGS		
PP20-DR-SD-0010	NOTES FOR PRECAST AND PRE-TENSIONED BRIDGE BEAMS	B
PP20-DR-SD-0021	1225 SUPER T BEAM - TYPICAL GEOMETRY	B
PP20-DR-SD-0023	1225 SUPER T BEAM - PRE-STRESSING DETAILS (20m SPAN)	B
PP20-DR-SD-0024	1225 SUPER T BEAM - REINFORCEMENT DETAILS SHEET 1	B
PP20-DR-SD-0025	1225 SUPER T BEAM - REINFORCEMENT DETAILS SHEET 2	B
PP20-DR-SD-0031	SUPER T BEAM - COMMON DETAILS	C
PP20-DR-SD-0101	TL5 PRECAST BARRIER SHEET 1	C
PP20-DR-SD-0102	TL5 PRECAST BARRIER SHEET 2	C
PP20-DR-SD-0201	EDGE BARRIER RAIL SHEET 1	C
PP20-DR-SD-0202	EDGE BARRIER RAIL SHEET 2	B
PP20-DR-SD-0401	SETTLEMENT SLAB DETAILS	B
PP20-DR-SD-0501	ROBUST KERB	B
PP20-DR-SD-0601	STRUCTURAL FACING PANELS SHEET 1	A
PP20-DR-SD-0602	STRUCTURAL FACING PANELS SHEET 2	A

No.	Revision	By	Chk	Appd	Date
C	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
B	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17
A	30% DESIGN REVIEW	MAJ	ARK	JK	11.04.17

Scale (A1)	Design	Drawn	Checked	Approved For Construction
AS SHOWN	A.KIVELL	C.BURKE	G.BROWN	
Scale (A3)			B.FLYNN	



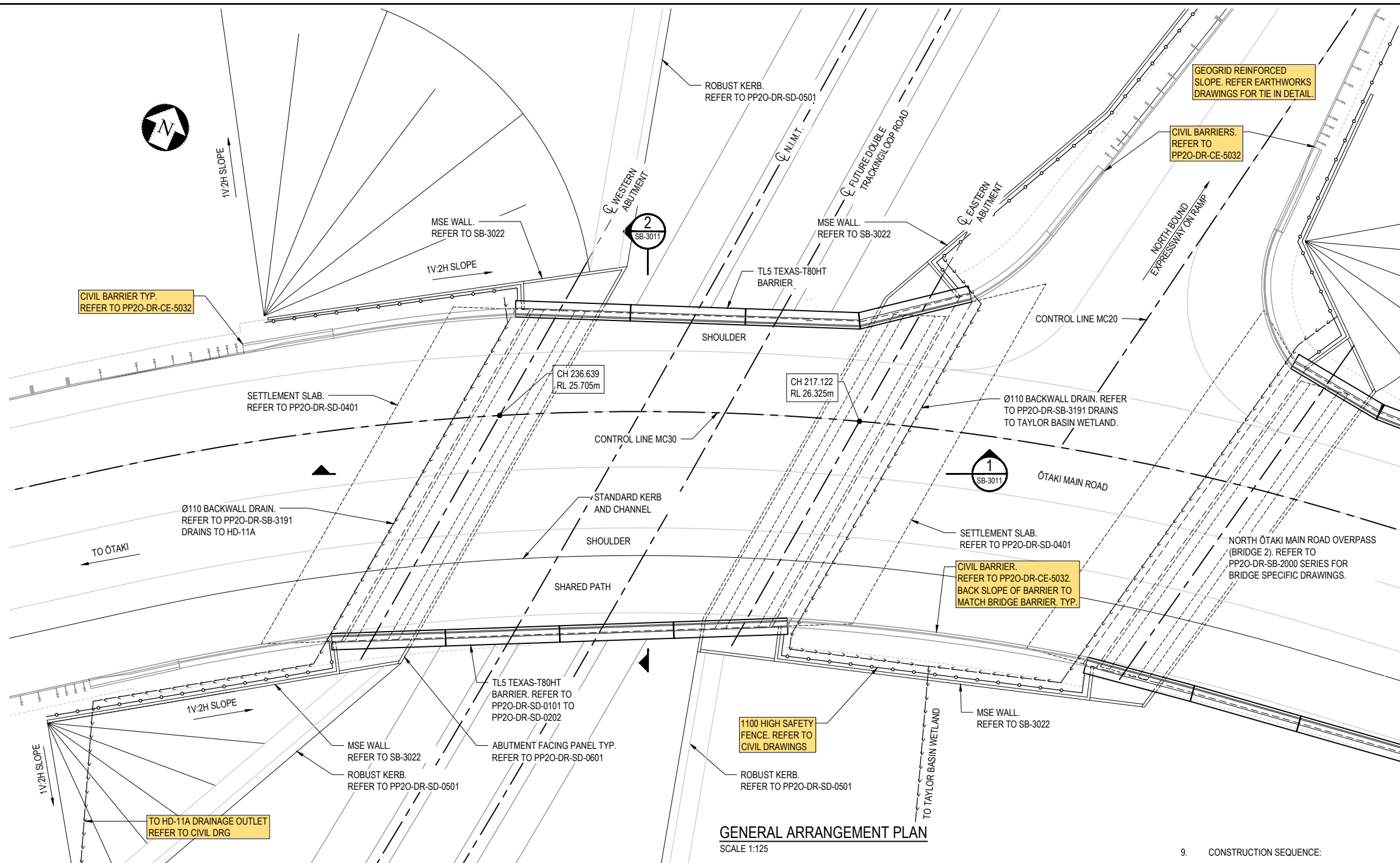
Peka Peka to Ōtaki Expressway



Subject:	NORTH ŌTAKI RAIL OVERPASS (BRIDGE 3)	Discipline:	STRUCTURAL
Title:	STRUCTURAL DRAWINGS COVER SHEET AND DRAWING LIST	Drawing No.:	PP20-DR-SB-3000
		Rev.:	C



**FOR INFORMATION
NOT FOR CONSTRUCTION**



NOTES:

1. REFERENCES
 - 1.1. REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
 - 1.2. REFER TO RELEVANT CIVIL DRAWINGS FOR ROADING GEOMETRY, BARRIER EXTENTS, LANE WIDTHS ETC.
 - 1.3. REFER TO RELEVANT CIVIL DRAWINGS FOR LOCATION OF UTILITIES AND SERVICES.
 - 1.4. ALL LEVELS GIVEN ARE TO STRUCTURAL SURFACE UNO.
2. DESIGN STANDARDS
 - 2.1. NZTA BRIDGE MANUAL, 3rd EDITION (2013), WITH PROJECT SPECIFIC AMENDMENTS.
 - 2.2. NZS 3101:2006 CONCRETE STRUCTURES STANDARD WITH PROJECT SPECIFIC AMENDMENTS.
 - 2.3. REFER TO DESIGN STATEMENT REPORT FOR FURTHER DETAILS.
3. DESIGN LOADING
 - 3.1. SUPERIMPOSED DEAD LOAD ALLOWANCE:
 - a) SURFACING = 2.0kPa (INCLUDING 0.5kPa FOR LEVELLING COURSE)
 - b) SERVICES = ALLOWANCES ARE MADE AS FOLLOWS:
 - i) 2 No Ø100mm TELECOMMUNICATIONS DUCT
 - ii) 2 No Ø200mm DUCTS FOR FUTURE SERVICES
 - iii) ADDITIONAL UNIFORMLY DISTRIBUTED LOAD APPLIED OVER ENTIRE DECK AREA OF 0.25kPa.
 - 3.2. TRAFFIC LOAD HN-HO-72
 - 3.3. SEISMIC LOAD BASED ON:
 - c) SUBSOIL CLASS D
 - d) ULS AEP (1/2500)
 - e) ULS DESIGN PGA 0.567g
 - 3.4. TEMPERATURE AND DIFFERENTIAL TEMPERATURE AS PER NZTA BRIDGE MANUAL.
 - 3.5. CREEP AND SHRINKAGE BASED ON AS3600 AND NZTA BRIDGE MANUAL 3rd EDITION FOR RELATIVE HUMIDITY 80%.
- 3.6. JACKING OF BRIDGE DECK FOR BEARING/ HORIZONTAL RESTRAINT REPLACEMENT. THE DESIGN INCLUDES THE FOLLOWING REQUIREMENTS:
 - a) TRAFFIC SHALL BE RESTRICTED TO 40km/h.
 - b) SEE ABUTMENT DRAWINGS FOR JACKING LOCATIONS AND LOADS.
 - c) JACKING LOADS ARE BASED ON HN LOADINGS
 - d) ALL JACKS AT EACH ABUTMENT SHALL BE HYDRAULICALLY LINKED AND HAVE A CENTRAL MECHANISM TO ENSURE THAT THE SAME VERTICAL DISPLACEMENTS OCCUR AT EACH JACKING POINT AT ALL TIMES DURING THE JACKING OPERATION.
 - e) BRIDGE BEARINGS ARE DESIGNED SHALL BE REPLACED USING LIFTS OF NOT GREATER THAN 10mm.
 - f) STEEL PLATES SHALL BE PLACED BETWEEN CONCRETE BEARING SURFACE AND HYDRAULIC JACK.
 - g) MAXIMUM ALLOWABLE CONTACT PRESSURE BETWEEN CONCRETE SURFACE AND STEEL PLATE SHALL BE 25MPa.
 - h) HORIZONTAL RESTRAINTS AT ABUTMENTS SHALL BE MAINTAINED.
4. DRAWING LIST
 - 4.1. FOR THE LIST OF ALL DRAWINGS APPLICABLE TO THIS BRIDGE, REFER TO DRG. SB-3000.
5. SPECIFICATIONS APPLICABLE TO THIS BRIDGE:
 - 5.1. C0203 - BULK EARTHWORKS
 - 5.2. C0600 - REINFORCED CONCRETE SUPPLY
 - 5.3. C0601 - REINFORCED CONCRETE CONSTRUCTION
 - 5.4. C0607 - PRE-STRESSED CONCRETE ELEMENTS
 - 5.5. C0614 - ANTI-GRAFFITI COATING
 - 5.6. C0700 - STRUCTURAL STEELWORK
6. CONSTRUCTION LOADS
 - 6.1. BRIDGE BEAMS ARE DESIGNED FOR CONSTRUCTION LIVE LOAD OF 1.5kPa. TEMPORARY WORK SHALL BE ADEQUATE FOR 1/500 APE (R = 1.0) SEISMIC AND WIND LOADING.

GENERAL ARRANGEMENT PLAN

SCALE 1:125

7. STRUCTURAL ELEMENTS INCLUDED IN PACKAGE:
 - 7.1. ABUTMENTS, APPROACH SLABS, PRE-STRESSED BEAMS, BEARINGS, TL5 TEXAS-T80HT BARRIERS WITH FASCIA, BACKWALL, MSE WALL WITH METAL STRIPS.
 - 7.2. TRAFFIC BARRIERS DETAILED IN THE STRUCTURAL DRAWINGS TERMINATE AT THE EXTENT OF THE BRIDGE (BARRIERS BEYOND THAT ARE CONSIDERED TO BE STANDARD ROAD TRAFFIC BARRIERS. FOR THESE REFER TO THE RELEVANT CIVIL DRAWINGS).
8. COATING FOR EXPOSED CONCRETE SURFACES:
 - 8.1. GRAFFITI SOLUTION (OR EQUIVALENT APPROVED BY THE DESIGNER) SHALL BE APPLIED TO THE EXPOSED CONCRETE SURFACES.
 - 8.2. FOR THE APPLICATION OF SURFACE COATING, PLEASE REFER TO THE SPECIFICATION C0614.
 - 8.3. THE FOLLOWING TABLE SUMMARISES THE EXTENT OF COATINGS TO CONCRETE SURFACES.

TABLE 1. CONCRETE SURFACE COATINGS

BRIDGE ELEMENTS	EXPOSED SURFACE	ANTI-GRAFFITI COATING
BRIDGE BARRIER	INSIDE FACES (FACING ŌTAKI MAIN ROAD)	YES
	TOP SURFACE AND OUTER FACE (FASCIA)	YES
ABUTMENTS	FRONT FACES (FACING RAIL TRACK)	YES
	SIDES OF ABUTMENTS	YES
DECK SOFFIT	1.5m HORIZONTALLY FROM AN ACCESSIBLE SUBSTRUCTURE ELEMENT	YES

9. CONSTRUCTION SEQUENCE:

TABLE 2. CONSTRUCTION SEQUENCE

SEQUENCE	ACTIVITY
1	CONSTRUCT TEMPORARY WORKS.
2	EXCAVATE TO BASE OF FORMATION LEVEL. UNDERCUT AND REPLACE UNSUITABLE MATERIAL.
3	CONSTRUCT SUBSOIL DRAINS, MSE WALLS AND APPROACH EMBANKMENTS.
4	MINIMUM 1 MONTH CONSTRUCTION HOLD MONITOR SETTLEMENTS. DESIGNER TO CONFIRM REMAINING SETTLEMENT IS ACCEPTABLE PRIOR TO BRIDGE CONSTRUCTION.
5	CONSTRUCT ABUTMENT BANK SEAT WITH SETTLEMENT PINS.
6	INSTALL PRECAST SUPER T BEAMS AND BEARINGS.
7	CAST ABUTMENT BACKWALL.
8	COMPLETE BRIDGE DECK.
9	BACKFILL UP TO SETTLEMENT SLAB AT BOTH ABUTMENTS.
10	INSTALL SETTLEMENT SLABS.
11	COMPLETE BACKFILL ADJACENT TO ABUTMENT BACKWALLS AT BOTH ABUTMENTS.
12	POUR FOOTPATH.
13	PLACE BARRIER AND POUR STITCH, INSTALL TOP RAILS.
14	MONITOR SETTLEMENT OF BRIDGE ABUTMENTS AND APPROACH EMBANKMENTS.
15	COMPLETE BRIDGE PAVEMENT, APPROACH EMBANKMENT PAVEMENT AND ANCILLARY ITEMS.
16	INSTALL UTILITIES TO THE BRIDGE AND RELOCATE TRAFFIC.

CONSTRUCTOR TO ADVISE DESIGNER IF ALTERNATIVE CONSTRUCTION SEQUENCE IS PROPOSED.
THE ABOVE CONSTRUCTION SEQUENCE SHOWS THE SEQUENCING AS ASSUMED FOR DESIGN PURPOSES.

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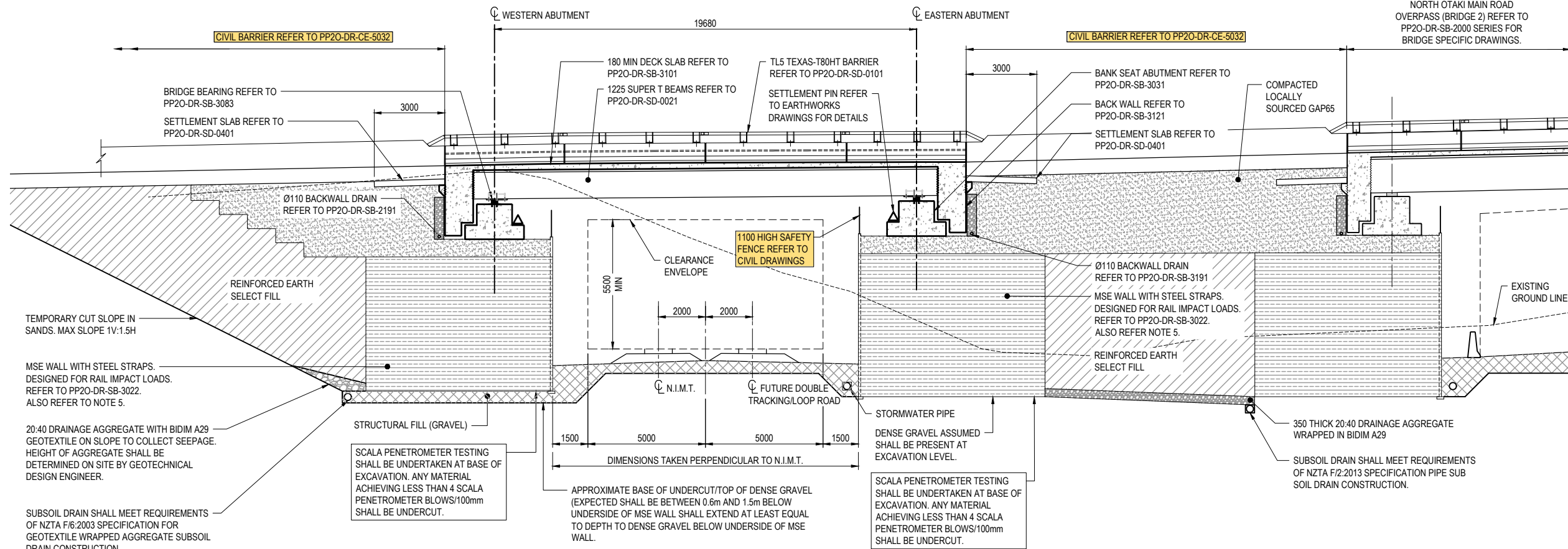
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C	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
B	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17
A	30% DESIGN REVIEW	MAJ	ARK	JK	11.04.17

Scale (A1)	Design	Date	Approved For
AS SHOWN	A.KIVELL	11.04.17	Construction
Scale (A3)	M.JULATON	03.04.17	
	G.BROWN	07.09.17	
	B.FLYNN		

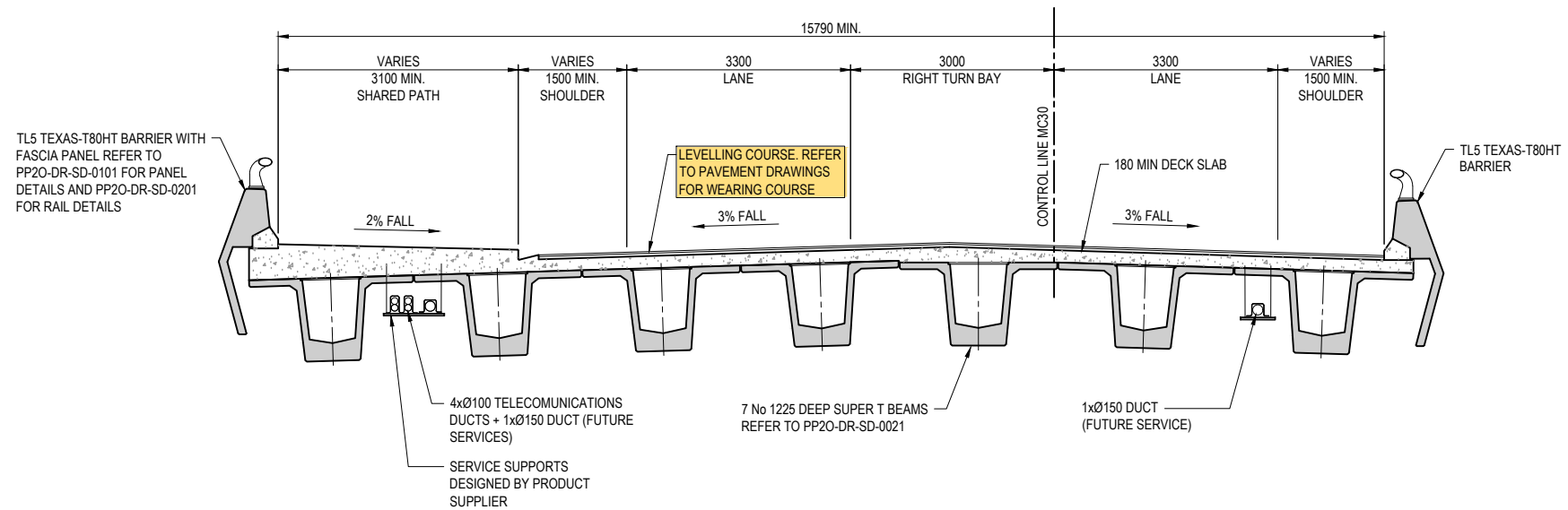


Subject:	NORTH ŌTAKI RAIL OVERPASS (BRIDGE 3)	Discipline:	STRUCTURAL
Title:	GENERAL ARRANGEMENT PLAN	Drawing No.:	PP20-DR-SB-3001
		Rev.:	C

- NOTES:**
- REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
 - REFER TO PP20-DR-SB-3001 FOR BRIDGE SPECIFIC NOTES.
 - THE SERVICES SUPPORT SYSTEM SHALL BE A UNISTRUT PROPRIETARY SYSTEM DESIGNED BY THE SUPPLIER.
 - THE SUPPLIER SHALL PROVIDE THE FIXING REQUIREMENTS FOR THE SERVICES SUPPORT SYSTEM TO CAST IN TO THE DECK SLAB.
 - MSE WALLS SHALL BE DESIGNED BY REINFORCED EARTH LTD (REL). MINIMUM REINFORCEMENT LENGTH 6.7m MINIMUM EMBEDMENT BELOW FINISHED GROUND LEVEL 0.5m. REINFORCEMENT LENGTH AND EMBEDMENT TO BE CONFIRMED BY REL. EXTENT OF MSE WALL SHALL BE CONFIRMED BY REL.



1 LONGITUDINAL SECTION
SB-3001 SCALE 1:100



2 TYPICAL CROSS SECTION
SB-3001 SCALE 1:50

No.	Revision	By	Chk	Appd	Date
C	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
B	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17
A	30% DESIGN REVIEW	MAJ	ARK	JK	11.04.17

Scale (A1)	Design	Drawn	Drawn Date	Approved For Construction
AS SHOWN	A.KIVELL	M.JULATON	11.04.17	03.04.17
Scale (A3)	Design Check	G.BROWN	07.09.17	
	Draw Check	B.FLYNN		

* Refer to Original Hardcopy for Signature

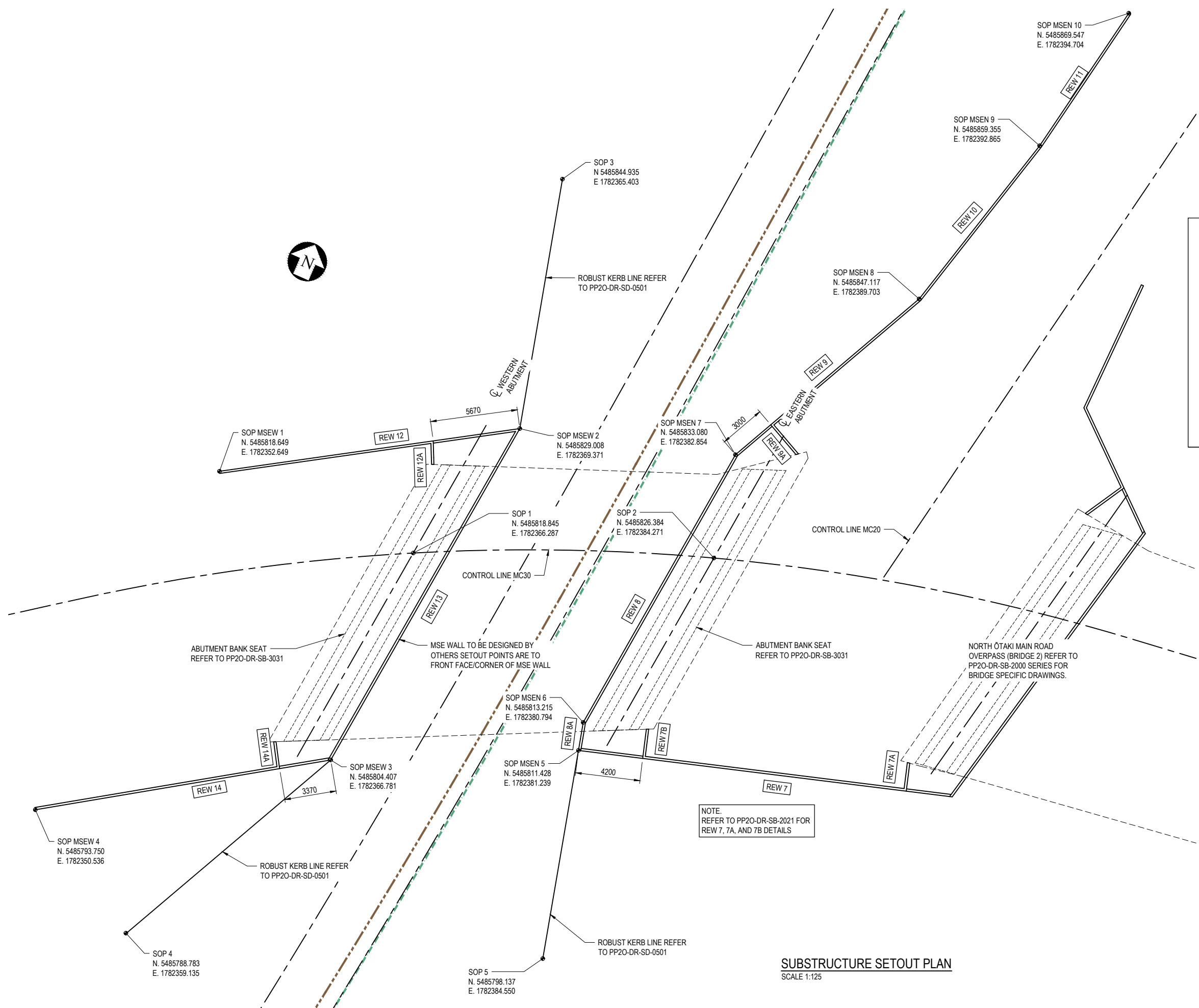
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Subject:	NORTH ŌTAKI RAIL OVERPASS (BRIDGE 3)	Discipline:	STRUCTURAL
Title:	GENERAL ARRANGEMENT SECTIONS	Drawing No.:	PP20-DR-SB-3011
		Rev.:	C

FOR INFORMATION NOT FOR CONSTRUCTION

NOTES:
 1. REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
 2. REFER TO PP20-DR-SB-3001 FOR BRIDGE SPECIFIC NOTES.

EXISTING		NEW	
— W —	PUBLIC WATER	— W —	PUBLIC WATER
— HW —	HAUTERE WATER	— HW —	HAUTERE WATER
— AW —	ARCUS WATER (PRIVATE IRRIGATION SUPPLY)	— AW —	ARCUS WATER (PRIVATE IRRIGATION SUPPLY)
— SW —	STORMWATER	— SW —	STORMWATER
— SS —	SANITARY SEWER	— SS —	SANITARY SEWER
— OH —	ELECTRA - OVERHEAD POWER CABLES	— OH —	ELECTRA - OVERHEAD POWER CABLES
— P —	ELECTRA - UNDERGROUND POWER CABLES	— P —	ELECTRA - UNDERGROUND POWER CABLES
— G —	GAS	— G —	GAS
— T —	CHORUS - TELECOMMUNICATIONS	— T —	CHORUS - TELECOMMUNICATIONS
— — —	KIWIRAIL FIBRE CABLE	— — —	KIWIRAIL FIBRE CABLE
— — —	KIWIRAIL SIGNALS CABLE	— — —	KIWIRAIL SIGNALS CABLE
+++++	RAILWAY	+++++	RAILWAY
---	TO BE REMOVED	---	TO BE REMOVED



SUBSTRUCTURE SETOUT PLAN
 SCALE 1:125

FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
C	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
B	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17
A	30% DESIGN REVIEW	MAJ	ARK	JK	11.04.17

Scale (A1)	Design	A.KIVELL	11.04.17	Approved For Construction
AS SHOWN	Drawn	C.BURKE	03.04.17	
Scale (A3)	Design Verifier	G.BROWN	07.09.17	Date
	Design Check	B.FLYNN		

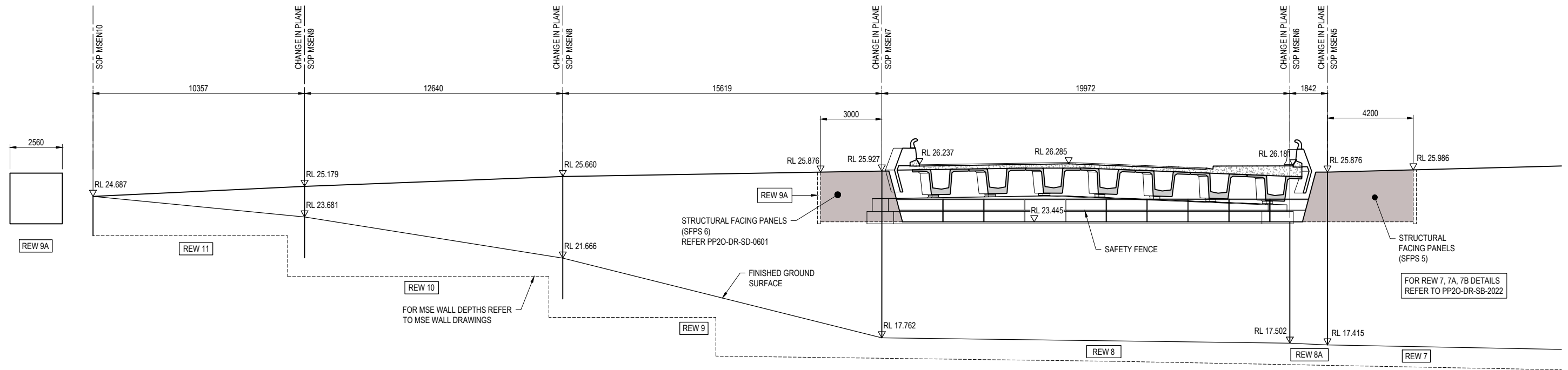
* Refer to Original Hardcopy for Signature

NZ TRANSPORT AGENCY **Peka Peka to Ōtaki Expressway** **Fletcher HIGGINS** **BECA** **Tonkin+Taylor**

Subject:	NORTH ŌTAKI RAIL OVERPASS (BRIDGE 3)	Discipline:	STRUCTURAL
Title:	GENERAL ARRANGEMENT SUBSTRUCTURE SETOUT PLAN	Drawing No.:	PP20-DR-SB-3021
		Rev.:	C

NOTES.

1. REFER TO PP20-DR-SA-0001 TO PP20-DR-SA-0004 FOR GENERAL NOTES.
2. REFER TO PP20-DR-SB-3001 FOR BRIDGE SPECIFIC NOTES



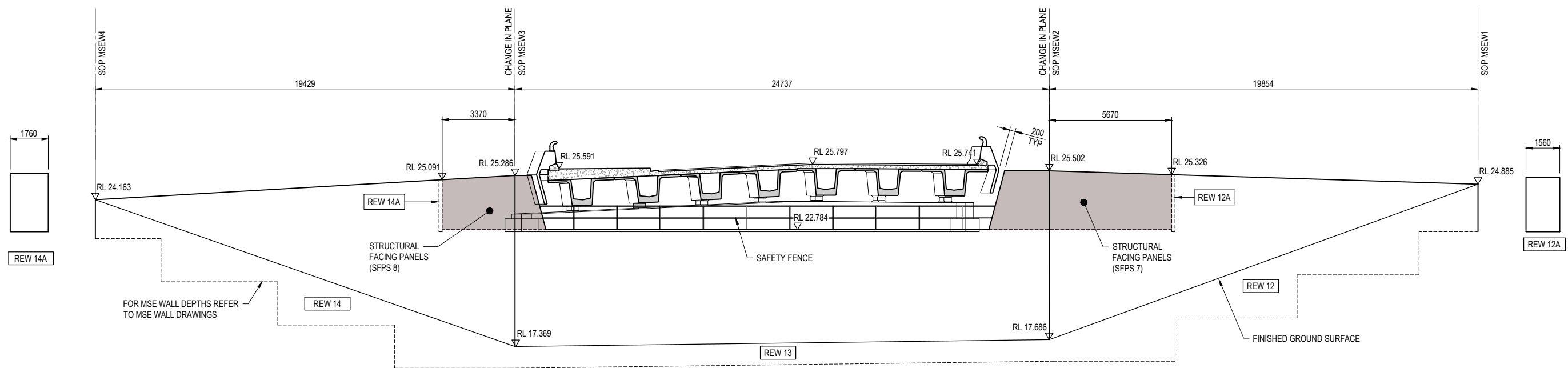
EASTERN ABUTMENT MSE WALL ELEVATION

SCALE 1:100

TABLE 1. STRUCTURAL FACING PANEL DIMENSIONS

PANEL	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G' (Degrees)
SFPS5	584	1274	2426	4200	584	345	93°
SFPS6	345	986	2431	3000	2482	320	160°
SFPS7	2104	2795	2718	5670	2542	345	127°
SFPS8	762	1502	2502	3370	2307	370	51°

REFER PP20-DR-SD-0601



WESTERN ABUTMENT MSE WALL ELEVATION

SCALE 1:100

**FOR INFORMATION
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
B	100% DESIGN REVIEW	CRB	ARK	JK	14.09.17
A	80% DESIGN REVIEW	MAJ	ARK	JK	17.07.17

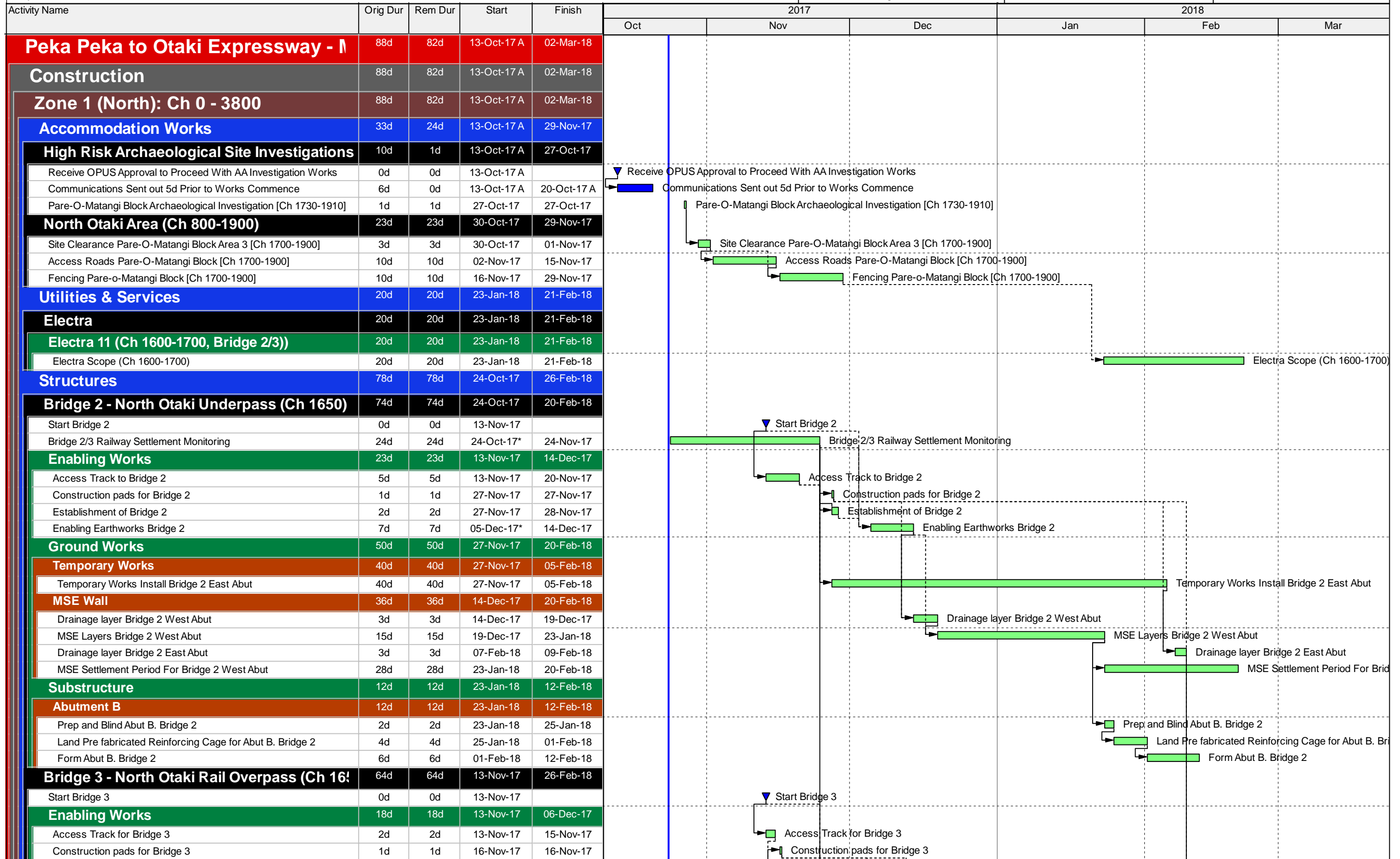
Scale (A1)	Design	A.KIVELL	11.04.17	Approved For Construction
AS SHOWN <td>Drawn</td> <td>C.BURKE</td> <td>03.04.17</td> <td></td>	Drawn	C.BURKE	03.04.17	
Scale (A3)	Design Verifier	G.BROWN	07.09.17	Date
	Design Check	B.FLYNN		

* Refer to Original Hardcopy for Signature

NZ TRANSPORT AGENCY **Peka Peka to Ōtaki Expressway** **Fletcher HIGGINS** **BECA** **Tonkin+Taylor**

Subject:	NORTH ŌTAKI RAIL OVERPASS (BRIDGE 3)	Discipline:	STRUCTURAL
Title:	SUBSTRUCTURE DETAILS	Drawing No.:	PP20-DR-SB-3022
		Rev.:	B

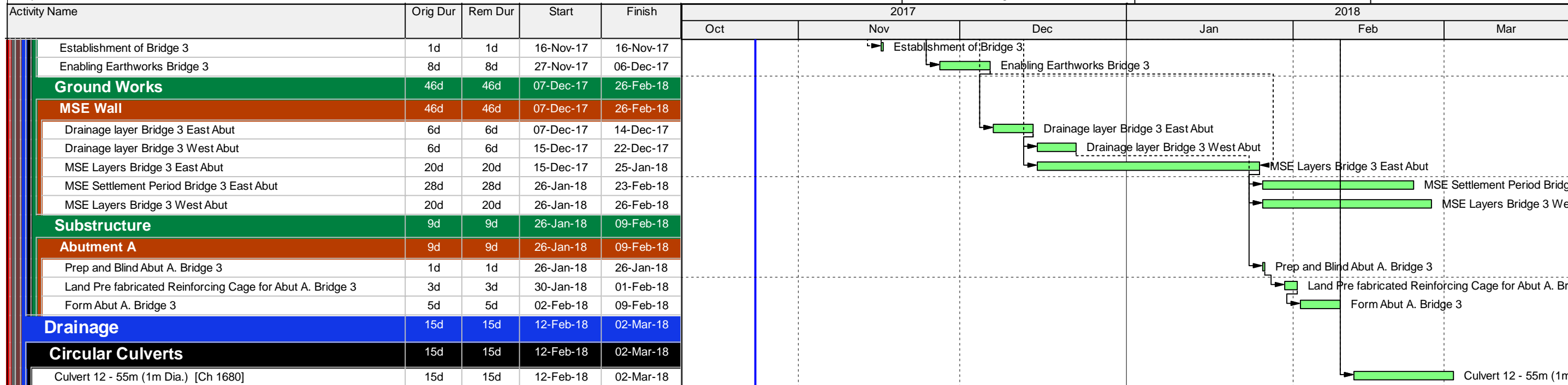
APPENDIX D – PROGRAMME



**Peka Peka to Otaki
BR02/03 Programme**

- Actual Work
- Remaining Work
- Critical Remaining Work
- ▼ Milestone





APPENDIX E – CULVERT SUMMARY

Culvert Summary Table

Culvert No.	Road Chainage	Type	Culvert Use	No. of Barrels	Size (m)			Length (m)	Cross section area (m ²)	Major / minor size	Invert Level (mRL, NZVD 2009)		Cover to Road / Rail (m)		Pipe Strength Class	Scope for Culvert Supplier
					Width	Depth	Embedment				Upstream	Downstream	Minimum	Maximum		
1	390	Box	Stream Conveyence	1	3.5	2	0.25	40	7.0	Major	22.6	22.25	0.7	2.35	N/A	Design and supply
2	740	Box	Flood Event	1	5	2	0	48	10.0	Major	25.5	24.9	4.0	4.75	N/A	Design and supply
3	940	Box	Stream Conveyance/ Flood Event	2	3	3	0	73	9.0	Major	24.3	24	3.05	3.75	N/A	Design and supply
					5	2	0.25	71	10.0	Major	23.3	23	5.15	5.9		
70	1520	Circular	Wetland Connection	1	0.825		0	87	0.5	Minor	17.675	17.325	2	3.35	Class 2	Supply only
12	1680	Circular	Wetland Connection	1	1.05		0	55	0.9	Minor	16.9	15.76	1.15	1.6	Class 2	Supply only
9	2000	Box	Stream Conveyence	1	2.5	3.5	0.5	80.60	8.8	Major	10.4	10.132	0.55	1.85	N/A	Design and supply
10											10.132	10	1.35	1.7		
13	1960	Circular	Wetland Outlet	1	0.9		0	22	0.6	Minor	12.3	12.1	0.6	3	Class 2	Supply only
7	2080	Box	Flood Event	2	5	1	0	33	5.0	Major	13.9	13.75	2.85	3.9	N/A	Design and supply
14	2200	Circular	Stream Conveyence	1	1.2		0	60	1.1	Minor	11.85	11.3	1.25	2.6	Class 3	Supply only
15b	2750	Circular	Flood Event	1	1.05		0	37	0.9	Minor	13.3	12	0.75	2.7	Class 3	Supply only
15c	2830	Circular	Flood Event	1	1.05		0	36	0.9	Minor	13	12	0.85	2.5	Class 3	Supply only
15d	2920	Circular	Flood Event	2	1.05		0	36	0.9	Minor	12.9	12	0.75	2.3	Class 3	Supply only
15e	3000	Box	Flood Event	1	3	2.75	0	39	8.3	Major	11.9	11.7	0.7	1.75	N/A	Design and supply
18	3340	Box	Flood Event	1	3.5	3	0	54	10.5	Major	11.7	11.4	3.25	3.95	N/A	Design and supply
24	7250	Box	Stream Conveyence	1	4	2	0.15	44.95	8.0	Major	16.25	15.85	0.85	2.25	N/A	Design and supply
23	7350	Box	Stream Conveyence	1	5	3.5	0.5	29	17.5	Major	17.5	17.1	0.6	1	N/A	Design and supply
23a	7200	Box	Flood Event	1	5	2	0	41	10.0	Major	18.9	18.45	3.95	4.75	N/A	Design and supply
27	7470	Box	Stream Conveyence	1	5	2	0	26	10.0	Major	16.4	16.2	1.25	1.8	N/A	Design and supply
28	7500	Box	Stream Conveyence	1	5	2	0	48.05	10.0	Major	15.95	15.4	0.95	2.45	N/A	Design and supply
34	7250	Box	Stream Conveyence	1	4	4	0.5 (d/s) 1.0 (u/s)	29	16.0	Major	12.5	12.5	0.6	1.55	N/A	Design and supply
35	8600	Box	Stream Conveyence	1	3.5	2	0.25	20.15	7.0	Major	13.9	13.8	0.95	1.95	N/A	Design and supply
36	8620	Box	Stream Conveyence	1	5	2	0.35	43.40***	10.0	Major	13.45	13.2	1.45	2.45	N/A	Design and supply
39	8920	Box	Stream Conveyence	2	5	2	0.285	35.65***	10.0	Major	13.7	13.2	0.75	1.70	N/A	Design and supply
					5	2	0.5	35.65***	10.0	Major	12.95	12.45	1.55	2.45	N/A	Design and supply
42	9020	Circular	Stream Conveyence	1	0.6		0.15	36	0.3	Minor	14.15	13.65	1.6	2.5	Class 3	Supply only
45	9400	Circular	Stream Conveyence	1	1.5		0	46	1.8	Minor	21.5	19.3	2.95	3.5	Class 3	Supply only
50	9950	Circular	Stream Conveyence	1	1.2		0.15	80	1.1	Minor	20.8	19.45	0.6	7.9	Class 3	Supply only
53	10080	Box	Stream Conveyence	2	2.5	2	0.25	70	5.0	Major	20	18.45	0.75	5.65	N/A	Design and supply
59	10830	Circular	Stream Conveyence	1	1.6		0.15	66	2.0	Minor	11.85	11.45	0.75	2.55	Class 3	Supply only
61	10970	Circular	Stream Conveyence	1	0.45		0	69	0.2	Minor	11.45	11	3.5	4.3	Class 2	Supply only
61A	10970	Circular	Stream Conveyence	1	0.525		0	TBC	0.2	Minor	TBC	TBC	2.7	3.25	Class 2	Supply only
64	11380	Box	Stream Conveyence	2	3	1.5	0.25	64	4.5	Major	14.15	12.7	0.6	2.35	N/A	Design and supply
66	11680	Circular	Stream Conveyence	2	1.6		0.15	68	2.0	Minor	12.55	11.4	1.15	2.2	Class 2	Supply only

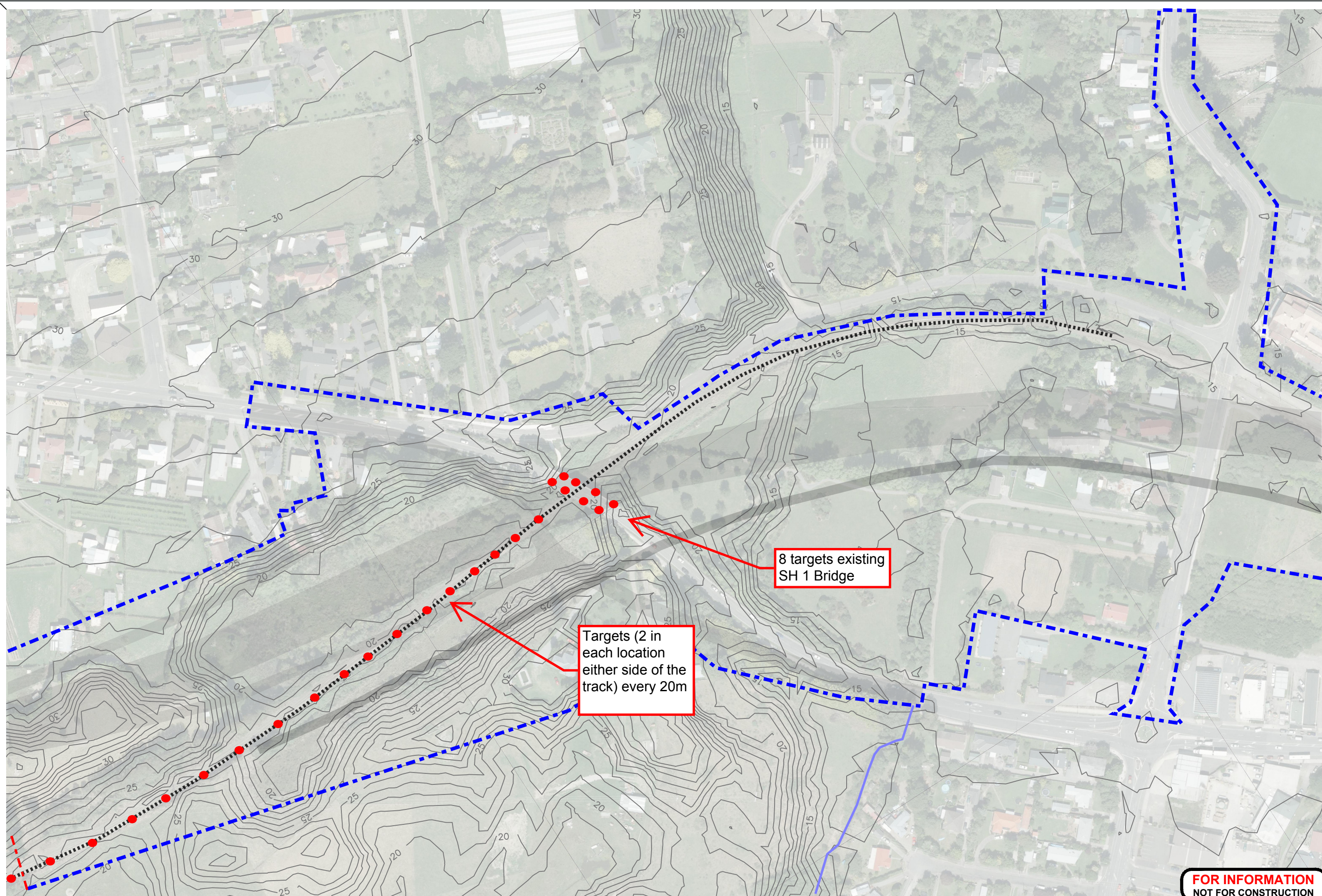
"Embedment" = depth of natural substrate infill within the culvert for fish passage.

"P1" Package 1 culverts

*** Culverts 36 and 39 likely to extend by 3.1m (2 no. 1.55m culvert sections per barrel) to incorporate a shared path.

"Minimum cover to road" excludes areas of lesser cover under batter slopes and swales that will not be accessed by vehicles.

APPENDIX F – SETTLEMENT MONITORING LOCATIONS



FOR INFORMATION
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
B	SSEMP FOR INFORMATION	WW			14.09.17
A	SSEMP FOR INFORMATION	AK	GD	AN	20.07.17

Scale (A1)	Design	AN	13.07.17	Approved For Construction
1:1000	Drawn	AK	18.07.17	
Scale (A3)	Dwg Verifier			
	Dwg Check			Date
	* Refer to Original Handcopy for Signature			

Subject:	SSEMP NZ1 Settlement Locations - pre-works
Title:	Settlement Marks Bridge 2 and 3

Discipline:	CIVIL
Drawing No.:	SSEMP-NZ1-SM
Rev:	B

Document No. \\M2PPSP\FCC\INTERNAL\DA\WWW\0010270 SECTOR GENERAL\PRECAST WORKING SHOP DRAWINGS\PP20\DR-CE-0801-0818 2017-06-26 STANDARD\SKAS.DWG

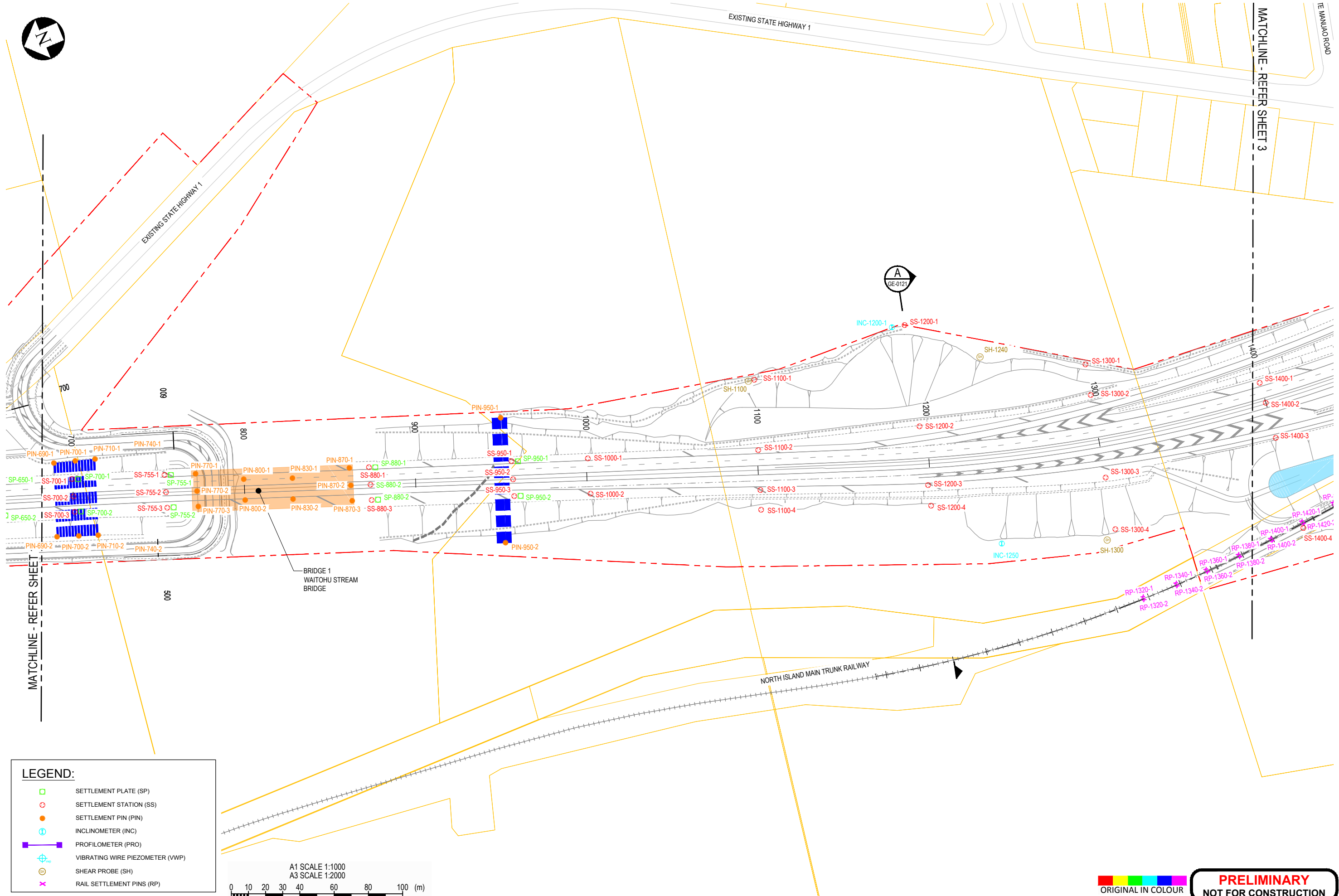


MATCHLINE - REFER SHEET 3

TE MANUA ROAD

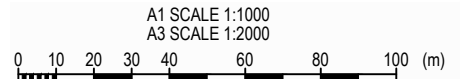
EXISTING STATE HIGHWAY 1

EXISTING STATE HIGHWAY 1



LEGEND:

- SETTLEMENT PLATE (SP)
- SETTLEMENT STATION (SS)
- SETTLEMENT PIN (PIN)
- INCLINOMETER (INC)
- PROFILOMETER (PRO)
- VIBRATING WIRE PIEZOMETER (VWP)
- SHEAR PROBE (SH)
- RAIL SETTLEMENT PINS (RP)



ORIGINAL IN COLOUR

PRELIMINARY
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
B	100% DESIGN	JL	TH	BS	07.11.17
A	80% DESIGN (NORTH)	GD	TH	BS	31.05.17

Scale	Design	Drawn	Date	Approved For Construction
Scale (A1) 1:1000	T. HAXELL	G. DOWN	31.01.17	
Scale (A3) 1:2000			31.01.17	

* Refer to Original Hardcopy for Signature



Peka Peka to Ōtaki Expressway

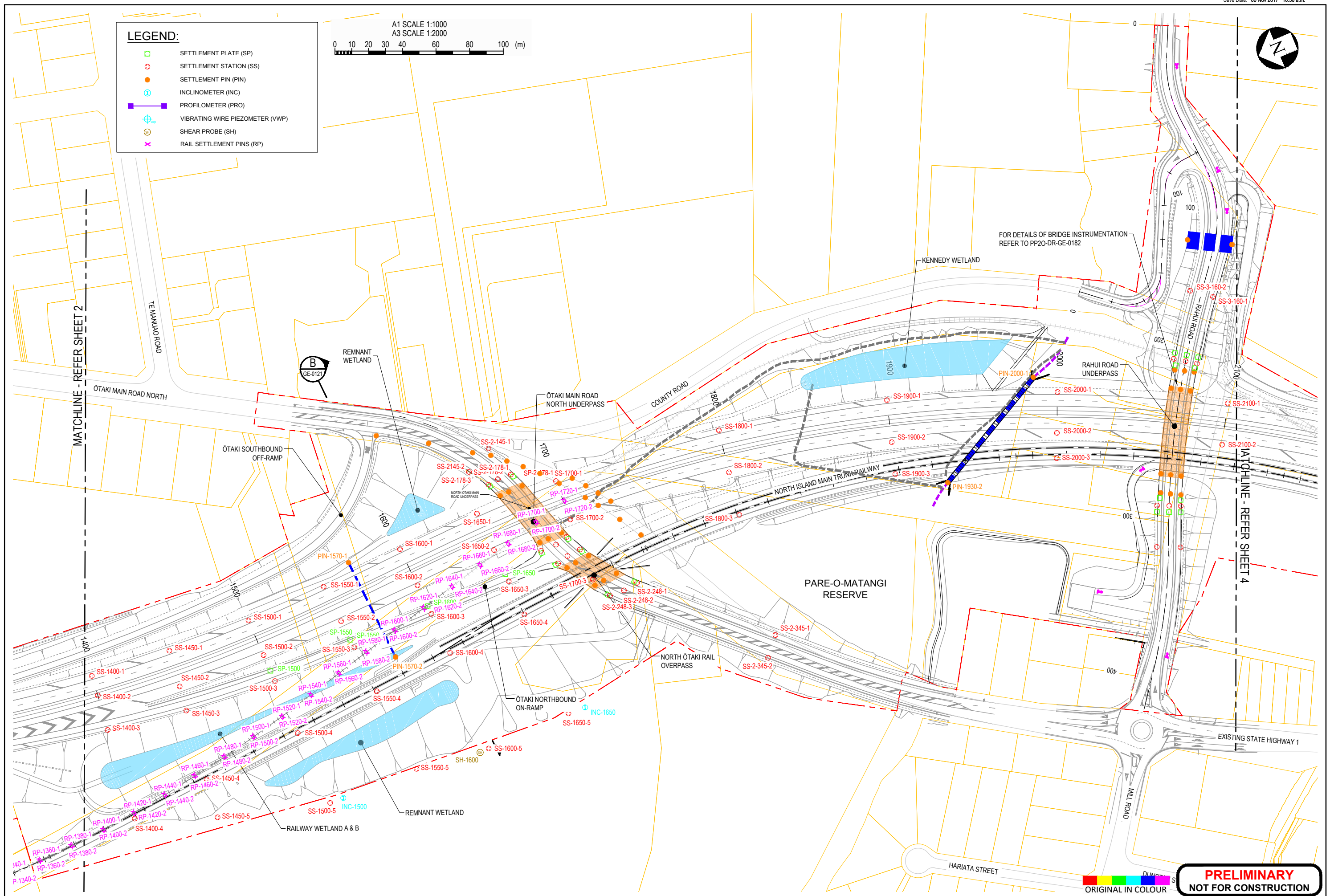
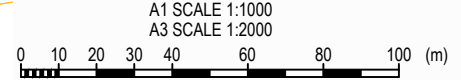


Subject:	EARTHWORKS	Discipline:	GEOTECHNICAL
Title:	GEOTECHNICAL INSTRUMENTATION PLAN SHEET 2 OF 6	Drawing No.:	PP20-DR-GE-0102

Rev.	B
------	---

LEGEND:

- SETTLEMENT PLATE (SP)
- SETTLEMENT STATION (SS)
- SETTLEMENT PIN (PIN)
- ⊕ INCLINOMETER (INC)
- ▬ PROFILOMETER (PRO)
- ⊕ VIBRATING WIRE PIEZOMETER (VWP)
- ⊕ SHEAR PROBE (SH)
- ✕ RAIL SETTLEMENT PINS (RP)



FOR DETAILS OF BRIDGE INSTRUMENTATION REFER TO PP20-DR-GE-0182

PRELIMINARY
NOT FOR CONSTRUCTION

B	100% DESIGN	JL	TH	BS	07.11.17
A	80% DESIGN (NORTH)	GD	TH	BS	31.05.17
No.	Revision	By	Chk	Appd	Date

Scale (A1)	1:1000	Design	T. HAXELL	31.01.17	Approved For Construction
Scale (A3)	1:2000	Drawn	G. DOWN	31.01.17	
		Dwg Verifier			
		Dwg Check			
		1* Refer to Original Hardcopy for Signature			

NZ TRANSPORT AGENCY
Peka Peka to Otaki Expressway

Fletcher HIGGINS
BECA Tonkin+Taylor

Subject:	EARTHWORKS	Discipline:	GEOTECHNICAL
Title:	GEOTECHNICAL INSTRUMENTATION PLAN	Drawing No.:	PP20-DR-GE-0103
	SHEET 3 OF 6	Rev.:	B

Document No. P-13000 - DESIGN DEVELOPMENT GENERAL/09 CAD/DRAWINGS/GEOPRO-DR-GE-0101-0118.DWG

APPENDIX G – RISK REGISTER

PP2O Environmental Risk Register: Bridge 2 and 3 location

Severity					
Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Medium (8)	High (13)	Very High (20)	Very High (23)	Very High (25)
Likely	Low (6)	Medium (11)	High (17)	Very High (21)	Very High (24)
Possible	Low (4)	Medium (9)	High (12)	Very High (18)	Very High (22)
Unlikely	Low (2)	Low (5)	Medium (10)	High (15)	Very High (19)
Rare	Low (1)	Low (3)	Low (7)	High (14)	High (16)

Estimating Likelihood		
Category	Chance of event	Frequency of event (includes Near Misses)
Almost certain	Is expected to occur in most circumstances	Occurred at least once in the last month within the BU
Likely	Will probably occur in most circumstances	Occurred at least once in the last 3 months within Fletcher Building
Possible	Might occur at some time	Occurred at least once in the last year within Fletcher Building
Unlikely	Could occur at some time	Occurred less than once within your industry
Rare	May occur only in exceptional circumstances	No known experience within your industry

Estimating Severity			
Category	Health & Safety	Environment	Financial Cost
Insignificant	Non-treatment Injury Pain & discomfort	Onsite/Offsite release contained in controls	Less than \$1,000
Minor	First Aid Treatment	Onsite/Offsite release cleaned up with internal resources	More than \$1,000 and less than \$10,000
Moderate	Medical Treatment Injury (MTI) Lost Time Injury (LTI)	Onsite/Offsite release cleaned up with specialist assistance Damage to items of ecological or culture significance	More than \$10,000 and less than \$100,000 Major enforcement against the company
Major	FB Serious Injury (refer FB Managing EHS Incidents Standard for definition)	Onsite/Offsite release with Major short term negative effects Major damage to items of ecological or culture significance	More than \$100,000 and less than \$500,000 Prosecution against the company Negative local publicity
Catastrophic	Fatality	Onsite/Offsite toxic release with detrimental long term effects	More than \$500,000 Prosecution or significant restriction on operational activities against the company Negative National publicity

Issue	Likelihood Severity		Risk	Controls	Likelihood Severity		Residual Risk
	Likelihood	Severity			Likelihood	Severity	
Lack of environmental awareness demonstrated by workers	Possible	Minor	Medium	Workers on this particular site to be present during pre-start meeting. Environmental team to discuss site specific requirements associated with works on Bridge's 2 and 3.	Unlikely	Minor	Low
Untreated sediment discharge to water	Possible	Moderate	High	Erosion and sediment controls implemented and checked regularly. Environmental Team undertake regular inspections. Foremen inspect controls regularly. Checks undertaken prior to forecast heavy rain in accordance with the project ESCP.	Unlikely	Moderate	Medium
Sediment tracked onto roadways	Likely	Minor	Medium	Stabilised accessways at two site access points. Monitoring of exit points and sweeping if necessary.	Possible	Minor	Medium
Cement runoff during concrete curing process at bridge sites	Possible	Moderate	High	Best practice used. Runoff must be contained on site. Environmental team to check set-up prior to works. If spill occurs, spill response plan to be implemented and notification requirements to be followed in accordance with the EMP / ESCP.	Unlikely	Major	High
Previously unidentified archaeological site disturbance	Possible	Moderate	High	Site inductions, accidental discovery protocol implemented	Possible	Minor	Medium
Non-compliant construction noise levels	Possible	Moderate	High	Follow procedures in CNVMP. Implement mitigation measures. Keep residents informed. Undertake noise monitoring. Seek additional advice from external specialists.	Possible	Moderate	High
Non-compliant construction vibration levels	Possible	Moderate	Very High	Follow procedures in CNVMP. Implement mitigation measures. Keep residents informed. Undertake vibration monitoring. Seek additional advice from external specialists.	Possible	Moderate	High
Construction waste, general waste discharged off site	Possible	Minor	Medium	Use waste separation facilities, recycling wherever possible. Keep site tidy.	Unlikely	Minor	Low

Dust discharged beyond the boundary which is deemed to be offensive or objectionable	Likely	Moderate	High	Follow procedures in CAQMP. Monitor wind direction and strength. Utilise water carts and sprinklers. Extra vigilance taken near sensitive receptors. Keep residents informed.	Possible	Moderate	High
Odour discharged beyond the boundary which is deemed to be offensive or objectionable	Possible	Minor	Medium	Follow procedures in CAQMP. Monitor wind direction and strength particularly around high risk activities. Implement mitigation as required. Keep residents informed.	Unlikely	Minor	Low

Oil spill from hydraulic hose burst	Possible	Moderate	High	Maintain equipment regularly. Implement spill plan. Ensure personnel are trained in oil spill response.	Possible	Moderate	High
Spill as a result of refuelling	Possible	Moderate	High	Do not leave vehicle unattended while refuelling. Refuel at least 10m away from wetland. Know where spill kit is and how to use it.	Unlikely	Moderate	Medium
Spill of other hazardous substance to land or water	Possible	Moderate	High	Implement spill response plan. Ensure personnel are trained in spill response. Know where spill kits are located.	Possible	Moderate	High
Groundwater impacts to adjacent properties	Possible	Moderate	High	Follow monitoring procedures in GMP, maintain communication with residents, engage expert as required.	Possible	Moderate	High
Settlement impacts to adjacent properties	Possible	Moderate	High	Follow monitoring procedures, maintain communication with residents, engage expert as required.	Possible	Moderate	High

APPENDIX H – SITE SPECIFIC TRAFFIC MANAGEMENT PLAN

Site Specific Traffic Management Plan

– Peka to Ōtaki Project

FCCL-TM-MPN-0003

Final – November 2017

Contents

Authorisation and Revision Record	2
Certification Record.....	2
1 Introduction.....	3
1.1 The SSTMP and TMP Process	4
2 SSTMP CONSENT CONSIDERATIONS.....	5
2.1 Proposed Temporary Traffic Management Measures - BOI condition 34 b (i).....	5
2.2 Assessment of delays - BOI condition 34 b (ii)	5
2.3 Detour Routes - BOI condition 34 b (iii)	5
2.4 Existing Accesses - BOI condition 34 b (iv)	5
2.5 Pedestrian and Cyclist Access - BOI condition 34 b (v)	5
2.6 Maintaining Existing Transport Services - BOI condition 34 b (vi)	6
2.7 Temporary Speed Limits (TSL) - BOI condition 34 b (vii)	6
2.8 Access to & From the Construction Site - BOI condition 34 b (viii).....	6
2.9 Communications and Stakeholders - BOI condition 34 b (xi).....	6
3 Additional CTMP Considerations	7
..... Kiwirail	
.....	7
3.1 NIMTR - CTMP section 2.1.2	7
3.2 Emergency Action Plan(s) – CTMP section 3.2.3.8.....	7
3.3 Access to KDCDC Owned and Operated Water and Waste Water Assets – CTMP section	
3.2.1.1.7	7
3.4 Monitoring, Auditing & Reporting – CTMP sections 3.3 & 3.4	7
3.5 Complaints – CTMP sections 3.5	7
Appendix A – site access point (i.d) and location	8

1 INTRODUCTION

This Site Specific Traffic Management Plan (SSTMP) provides the necessary information to demonstrate how the project team plan to avoid or mitigate potential construction traffic effects from activities associated with project-wide site clearance and enabling works activities as outlined in **SSEMP NZ1**.

This SSTMP reflects the requirements of the Construction Traffic Management Plan (CTMP) including sections 1.3 (Performance Standards) and section 3.2.1 - specifically the need to interface with TTM on other networks. This plan is also consistent with the requirements set out in the over-arching Construction Environmental Management Plan (CEMP).

This document is intended to be utilised by the construction team to clearly identify any site specific traffic management requirements that must be adhered to prior to, and during works in any given area.

The scope of works detailed within **SSEMP NZ1** and for which this SSTMP covers includes:

- Enabling earthworks between between chainages 1000 – 2000
- Construction of Bridge's 2 and 3

The temporary traffic management required to carry out these works across the site will consist of various types of Temporary Closures including, but not limited to, Shoulder, Footpath, Lane, Stop/Go, Contra Flow and Temporary Concrete Barrier installations.

Specific Traffic Management methodologies will be finalised and submitted to the relevant Road Controlling Authority as the Construction Programme is finalised and becomes more detailed. These Site Specific Traffic Management Plans will cover of specific mitigation for each individual temporary traffic management requirement.

1.1 The SSTMP and TMP Process

This SSTMP provides the necessary information from a project level on how the effects of construction traffic related to the site activities will be avoided or mitigated across the two roading networks in the location of the expressway works i.e. the State Highway Network (NZTA) and the local road network (KCDC)

Each of the two Road Controlling Authorities (RCA's) has its own processes and procedures for the approvals (TMP's) and implementation of temporary Traffic management within their respective networks which is separate to the SSTMP process.

It is recognised that approval / implementation of TMPs associated with this SSTMP will be staged and implemented at differing times over the course of the works. In addition, it is recognised that the TMP's themselves may alter due to both project and surrounding community requirements.

The purpose of this SSTMP is to provide the base (minimum) standard of service / maximum practical level of mitigation to be incorporated into the development of the respective TMP's all the while ensuring that the BOI consent conditions and subsequent CTMP requirements are met during the construction process.

2 SSTMP CONSENT CONSIDERATIONS

Reference should also be made to section 3.2 of the CTMP.

2.1 Proposed Temporary Traffic Management Measures - BOI condition 34 b (i)

Each of the work areas will have the required (CoPTTM) signage and early warning delineation provided by a combination of cones and line marking – all in accordance with the respective RCA TMP requirements.

2.2 Assessment of delays - BOI condition 34 b (ii)

Each Traffic Management plan will incorporate an assessment of expected delays and will also provide delay calculations.

2.3 Detour Routes - BOI condition 34 b (iii)

There are no expected detours associated with the Temporary Traffic Management measures included within this SSTMP. Should a Detour Route be identified a Traffic Management Plan will be subject to review by the relevant RCA before implementation. It is expected that should any Detour be required this will be for short term activities only.

2.4 Existing Accesses - BOI condition 34 b (iv)

The proposed Temporary Traffic Management measures do not knowingly affect existing accesses to private or commercial properties.

2.5 Pedestrian and Cyclist Access - BOI condition 34 b (v)

The work area does not affect any dedicated cycle paths or lanes though their set out and operation will be mindful of cyclists in accordance with CoPTTM and applicable RCA requirements.

2.6 Maintaining Existing Transport Services - BOI condition 34 b (vi)

The proposed Temporary Traffic Management measures for implementation of the work areas will not affect any existing public transport services and facilities such as bus stops.

2.7 Temporary Speed Limits (TSL) - BOI condition 34 b (vii)

The use of TSL's will be kept to a minimum and will be identified as and when required in Traffic Management Plans submitted to and approved by the relevant RCA.

2.8 Access to & From the Construction Site - BOI condition 34 b (viii)

The primary objective of this SSTMP is the planning (TMP's), approvals (RCA's) and incorporation of Site Access Points (SAP's) as outlined in the attached drawings to ensure the safe and efficient access to and from site of construction related traffic.

The operating hours of the SAP's will be in accordance with the proposed hours of work included within the **CNVMP i.e.**

- Monday to Friday 6.30am to 8pm
- Saturday 7.30am to 6pm

Operation outside those hours will be at the approval of the Engineer and in accordance with the provisions of the **CNVMP**.

2.9 Communications and Stakeholders - BOI condition 34 b (ix)

As the effects of the proposed measures are as yet unknown, implementation and operation of the SSTMP's will be communicated to stakeholders, road users and the community via the methods and processes as included within the project Stakeholder and Communications Management Plan, with particular emphasis on the key groups identified in Section 3.1 of the CTMP as required.

3 ADDITIONAL CTMP CONSIDERATIONS

3.1 Kiwirail NIMTR - CTMP section 2.1.2

The implementation and operation of some TMP's may involve the need to collaborate with Kiwirail as sites may cross the NIMT Railway or existing at grade carriageway crossings. Traffic Management strategies will include having no delays created for Kiwirail and the NIMT.

3.2 Emergency Action Plan(s) – CTMP section 3.2.3.8

All emergency services shall have unimpeded access along all State Highway and local roads 24 hrs. per day.

3.3 Access to KCDC Owned and Operated Water and Waste Water Assets – CTMP section 3.2.1.1.7

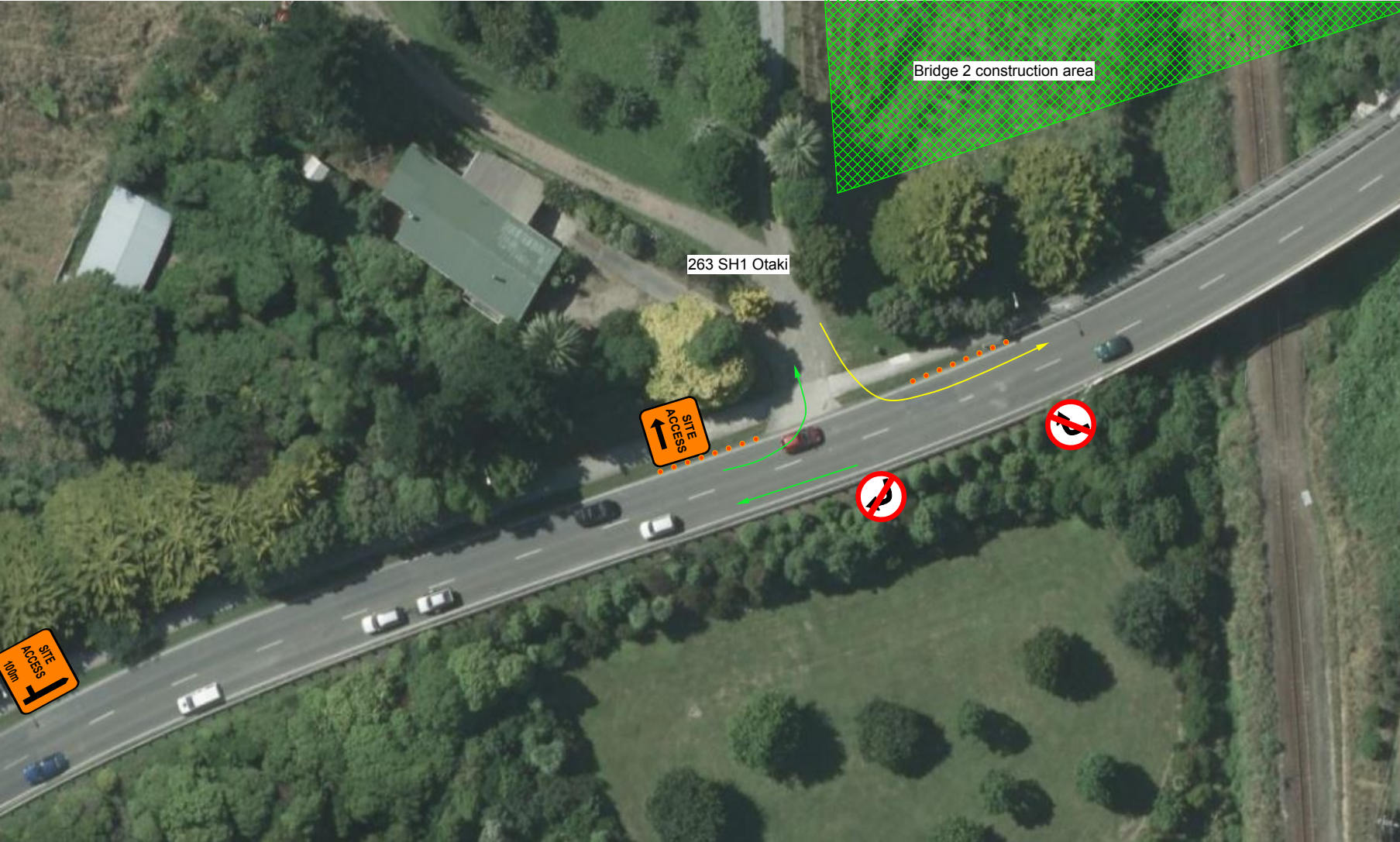
Access to existing KCDC water and waste water assets will not be impeded by any SAPs outlined in this SSTMP.

3.4 Monitoring, Auditing & Reporting – CTMP sections 3.3 & 3.4

Monitoring, auditing and reporting of the traffic management measure (once implemented) shall be in accordance with the CTMP.

3.5 Complaints – CTMP sections 3.5

Feedback including complaints received related to the implementation of Temporary Traffic Management measures covered within this SSTMP shall be recorded and processed in line with the CTMP.



Situation: Site Access Point 15

Drawing No: P20-SAP15-EMP1

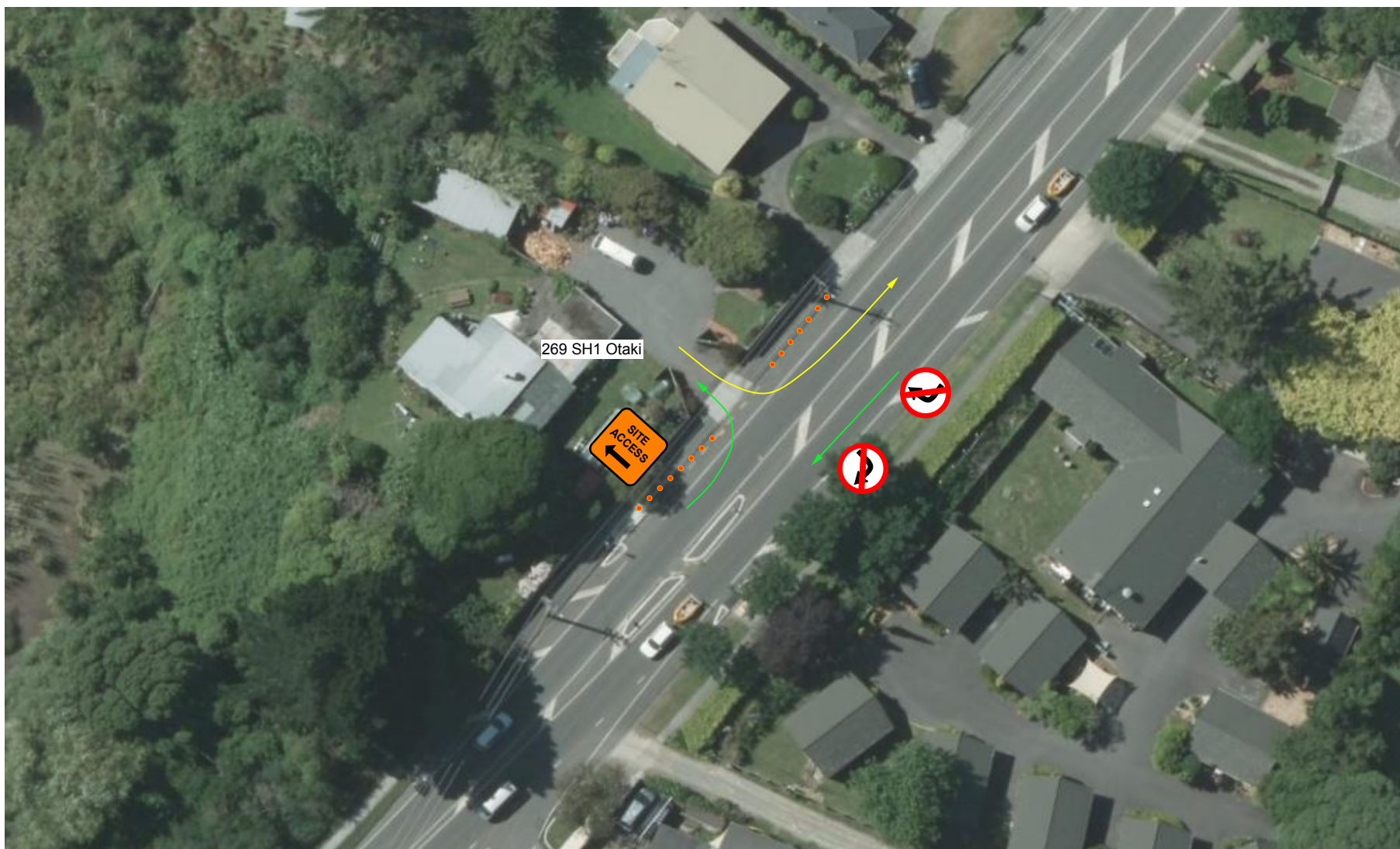
Revision: 1
Drawing By: Chris Harmer
Checked:
Date: 23/11/17

Drawing Title: Bridge 2 Construction Access

TMC Approval:

Peka Peka to Ōtaki Expressway





Situation: Site Access Point 15	Drawing No: P20-SAP15-EMP2	Revision: 1
		Drawing By: Chris Harmer
Drawing Title: Bridge 3 Construction Access		Checked:
		Date: 23/11/17
		TMC Approval:

Peka Peka to Ōtaki Expressway



Situation: Site Access Point 15	Drawing No: P20-SAP15-EMP3	Revision: 1
		Drawing By: Chris Harmer
Drawing Title: Travel Route		Checked:
		Date: 23/11/17
		TMC Approval:

Peka Peka to Ōtaki Expressway