From: Debbie M Cleary
Sent: Thursday, 1 June 2023 9:57 AM
To: Jeffrey J Lavey
Subject: Notifiable Road Use search request and Daandine Nandi Road
Attachments: Daandine Nandi Road.pdf

Jeff

Please find attached documentation.

I have also spoken with Veronica in relation to this request.

I have searched multiple DMS databases and have only located the attached documentation.

Not sure if this will help you.

Kind regards,

Debbie Cleary
Program Support Officer | Southern Queensland Region
Program Delivery and Operations | Infrastructure Management and Delivery Division
Department of Transport and Main Roads

P: 07 4661 6411
Ground Floor | 306 Wood Street | Warwick Qld 4370
Locked Bag 1 | Warwick Qld 4370
debbie.m.cleary@tmr.qld.gov.au
www.tmr.qld.gov.au



From: Jeffrey J Lavey <Jeffrey.J.Lavey@tmr.qld.gov.au>
Sent: Thursday, 1 June 2023 9:50 AM
To: Debbie M Cleary <debbie.m.cleary@tmr.qld.gov.au>
Cc: Daniel A Naish <daniel.a.naish@tmr.qld.gov.au>
Subject: Notifiable Road Use search request and Daandine Nandi Road

Hi Debbie,

Some time has passed now since this request to records was made.
I am chasing the results of that search for Daniel.

Regards,

Jeff Lavey

Released under RTI - DTMR

Item

ITEM DETAILS

Item ID:	281979 - PDO	**Item Type:**	Email
Date Created:	30/08/2022	**Project ID:**	
Date Captured:	30/08/2022	**Sub Project ID:**	EDAM TM20-031252
Item Format:	Electronic	**Other Reference:**	E281799 281793
Circulation:		**Copies Sent To:**	DD_PP&CM_CM_All, DD_PP&CM_DF_All
Subject:	Arrow Energy - RE: SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)		
Function Term:	ROAD NETWORK MANAGEMENT	**Activity Term:**	ROAD CORRIDOR MAJOR WORKS
Container Title:	Arrow Energy - Daandine Gathering Pipeline - 1 x Gas, 1 x Water - Daandine-Nandi Rd & Dalby Kogan Rd	**Container ID:**	500/01375 [1]

ACTIONS & OWNERSHIP

Author:	NR	**Corporate Author:**	Arrow Energy
Author Title / Position:		**Complaint Classification:**	
Business Unit:			
Action Officer:	Linda M Arnold	**Action Required:**	Action Completed
		Action Date:	30/08/2022
Actioned Date:	02/09/2022		
Home Location:	DDD_Warwick Records	**Last Movement Date:**	30/08/2022

SECURITY & ACCESS

Security Classification:	UNCLASSIFIED INFORMATION
Security Access:	Unrestricted

ADDITIONAL INFORMATION

Description / Additional Info:

Up loaded into EDAm TM20-031252 as incoming correspondance

DOCUMENT CONTENTS

RE: SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)

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Subject RE: SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)
From [NR]@arrowenergy.com.au
To downsswr.office@tmr.qld.gov.au
Cc Lachlan.S.Jones@tmr.qld.gov.au, Christopher.R.Green@tmr.qld.gov.au, [NR]@arrowenergy.com.au, [NR]@arrowenergy.com.au, [NR]@arrowenergy.com.au, [NR]@arrowenergy.com.au, [NR]@brandoneng.com
Bcc
Sent 30/08/2022 11:22:47 AM
Attached
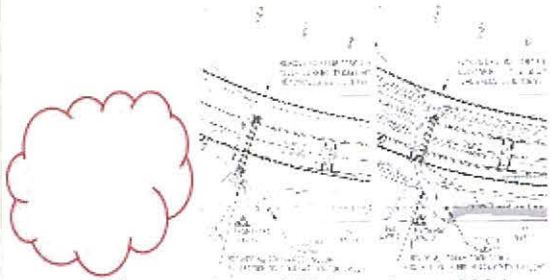


image001.png image002.jpg image003.jpg

Hi Lachlan,

Please see below table that Brandon?s has populated to capture all what has changed on the DNR-S1 drawings since Rev 0 original IFC issue; the ones with you for review at present are shown with bold text:

Contractor Drg No	Arrow Drg No	Drawing Title/Description	Rev 1	Rev 2	Rev 3
201237 C000	**S00B01-ARW-CIV-DET-005 6**	**DNR-S1 LOCALITY PLAN**	Drawing List ? Issue updated to reflect issue status on updated drawings	Drawing List ? Issue updated to reflect issue status on updated drawings	**Drawing List ? Issue updated to reflect issue status on updated drawings**
201237 C112	**S00B01-ARW-CIV-LAY-005 1**	**DNR-S1 LAYOUT SHEET 3 OF 6**	**Shortened culvert - bund,**		

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			embankment and table drains updated to suit		
201237 C114	S00B01-ARW-CIV-LAY-0053	DNR-S1 LAYOUT SHEET 5 OF 6	Gravel Access Track at CH2800 to have a 450 RCP under access.		
201237 C116	S00B01-ARW-CIV-LAY-0055	DNR-S1 THETEN ROAD INTERSECTION LAYOUT	Update Intersection Setout Points		
201237 C120	**S00B01-ARW-CIV-DET-0057**	**DNR-S1 TYPICAL SECTIONS AND DETAILS**	Pavement Depth changed on Type Section Daandine-Nandi Road - 1st Section	Pavement Depth changed on Type Section Daandine-Nandi Road (Bitumen Floodway) ? 3rd Section	**Steeper embankment in vicinity of Ch952.5 culvert on Type Section Daandine-Nandi Road (Road with 6% Superelevation & Curve Widening) ? 2nd Section**
201237 C121	**S00B01-ARW-CIV-DET-0058**	**DNR-S1 DRAINAGE DETAILS**	Cross Drainage Quantities Schedule Updated	**Shortened Culvert at CH952.5 ? Batter 1in3 and setout for drain added.**	
201237 C130	S00B01-ARW-CIV-LSN-0029	DNR-S1 LONGITUDINAL SECTIONS SHEET 1 OF 7	Earthworks quantities updated due to change in pavement thickness		
201237	**S00B01-ARW-CIV-LSN-003**	**DNR-S1**	Earthworks	**Label for culvert**	

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C131	**0**	**LONGITUDINAL SECTIONS SHEET 2 OF 7**	quantities updated due to change in pavement thickness	**updated to show shorter length**	
201237 C132	S00B01-ARW-CIV-LSN-0031	DNR-S1 LONGITUDINAL SECTIONS SHEET 3 OF 7	Earthworks quantities updated due to change in pavement thickness		
201237 C134	S00B01-ARW-CIV-LSN-0033	DNR-S1 LONGITUDINAL SECTIONS SHEET 5 OF 7	Earthworks quantities updated due to change in pavement thickness		
201237 C135	S00B01-ARW-CIV-LSN-0034	DNR-S1 LONGITUDINAL SECTIONS SHEET 6 OF 7	Earthworks quantities updated due to change in pavement thickness		
201237 C136	S00B01-ARW-CIV-LSN-0035	DNR-S1 LONGITUDINAL SECTIONS SHEET 7 OF 7	Earthworks quantities updated due to change in pavement thickness		
201237 C140	S00B01-ARW-CIV-CRS-0034	DNR-S1 CROSS SECTIONS SHEET 1 OF 11	Pavement hatch updated due to change in pavement thickness		
201237 C141	S00B01-ARW-CIV-CRS-0035	DNR-S1 CROSS SECTIONS SHEET	Pavement hatch updated due to		

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		2 OF 11	change in pavement thickness		
201237 C142	**S00B01-ARW-CIV-CRS-0036**	**DNR-S1 CROSS SECTIONS SHEET 3 OF 11**	**Pavement hatch updated due to change in pavement thickness**	**Batter steepened on RHS between Ch 940-1020 to suit shorter culvert at Ch 960**	
201237 C147	S00B01-ARW-CIV-CRS-0041	DNR-S1 CROSS SECTIONS SHEET 8 OF 11	Pavement hatch updated due to change in pavement thickness		
201237 C148	S00B01-ARW-CIV-CRS-0042	DNR-S1 CROSS SECTIONS SHEET 9 OF 11	Pavement hatch updated due to change in pavement thickness		
201237 C149	S00B01-ARW-CIV-CRS-0043	DNR-S1 CROSS SECTIONS SHEET 10 OF 11	Pavement hatch updated due to change in pavement thickness		
201237 C150	S00B01-ARW-CIV-CRS-0044	DNR-S1 CROSS SECTIONS SHEET 11 OF 11	Pavement hatch updated due to change in pavement thickness		

Please don?t hesitate to contact us should you have any questions or concerns.

Best Regards

NR

Released under RTI - DTMR

From: NR

Sent: Wednesday, 24 August 2022 4:17 PM

To: downsSWR.office@tmr.qld.gov.au

Cc: Lachlan S Jones <Lachlan.S.Jones@tmr.qld.gov.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @brandoneng.com>; christopher.r.green@tmr.qld.gov.au

Subject: RE: SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)

Hi Lachlan,

Further to the below and our telecon earlier today, herewith some background notes as requested by you to assist your reviewers understand the changes made.

- TMR?s Conditional approval of road works upgrading sections of Daandine Nandi Road was issued to Arrow on 1 July 2021, TMR Ref. TMR20-031252.
- A meeting was held with the landholders for properties downstream of the culvert and representatives from WDRC and TMR on site on Wed 02/02/2022, after construction had already started.
- The landholders were dissatisfied with the proposed extension of the culvert, which was to suit the wider road embankment. With construction of the culvert freshly started and base slab in place, the landholders got the impression that the flow regime was changing and insisted this be rectified.
- The landholders in attendance were NR and NR
- The TMR rep attending this meeting was Steve Luther. He was standing in for Chris Green who was NR
- There does not appear to be any written record of the meeting outcome, but suffice to say it was agreed between the parties to pull the culvert back and locally steepen the batters for the outlet channels to better match the pre-construction condition and appease the landholders.

You can see the effect of the culvert outlet being pulled back in the snippets below:

Snippet of S00B01-ARW-CIV-LAY-0051 **Rev 0**	Snippet of S00B01-ARW-CIV-LAY-0051 **Rev 1**

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Most the drawings should have revision clouds on the changes.

Please let me know if you need any further information.

Best Regards

NR

From: NR
Sent: Wednesday, 24 August 2022 10:06 AM
To: downsSWR.office@tmr.qld.gov.au
Cc: Lachlan S Jones <Lachlan.S.Jones@tmr.qld.gov.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @brandoneng.com>
Subject: SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)

Hi Lachlan,

For DTMR?s review please see ATTACHED copies of the B&A?s revised IFC drawings for Daandine Nandi Road Section 1 showing the shortened cross-drainage culvert at Ch 960 and localised steepening of the batters to suit.

Contractor Drg No	Arrow Drg No	Drawing Title/Description	Rev
201237 C000	S00B01-ARW-CIV-DET-005 6	DNR-S1 LOCALITY PLAN	3
201237 C112	S00B01-ARW-CIV-LAY-005 1	DNR-S1 LAYOUT SHEET 3 OF 6	1
201237 C120	S00B01-ARW-CIV-DET-005 7	DNR-S1 TYPICAL SECTIONS AND DETAILS	3

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201237 C121	S00B01-ARW-CIV-DET-005 8	DNR-S1 DRAINAGE DETAILS	2
201237 C131	S00B01-ARW-CIV-LSN-003 0	DNR-S1 LONGITUDINAL SECTIONS SHEET 2 OF 7	2
201237 C142	S00B01-ARW-CIV-CRS-003 6	DNR-S1 CROSS SECTIONS SHEET 3 OF 11	2

The changes reflect what was discussed with Steve Luther in the meeting with landholders on site earlier this year. We request that you review the same and confirm DTMR?s acceptance of the changes at the earliest opportunity.

A copy of the hydraulic modelling report prepared by Water Technology to confirm there is no material impact to the adjoining landholders is available on request.

Please do not hesitate to contact us should you have any questions or concerns.

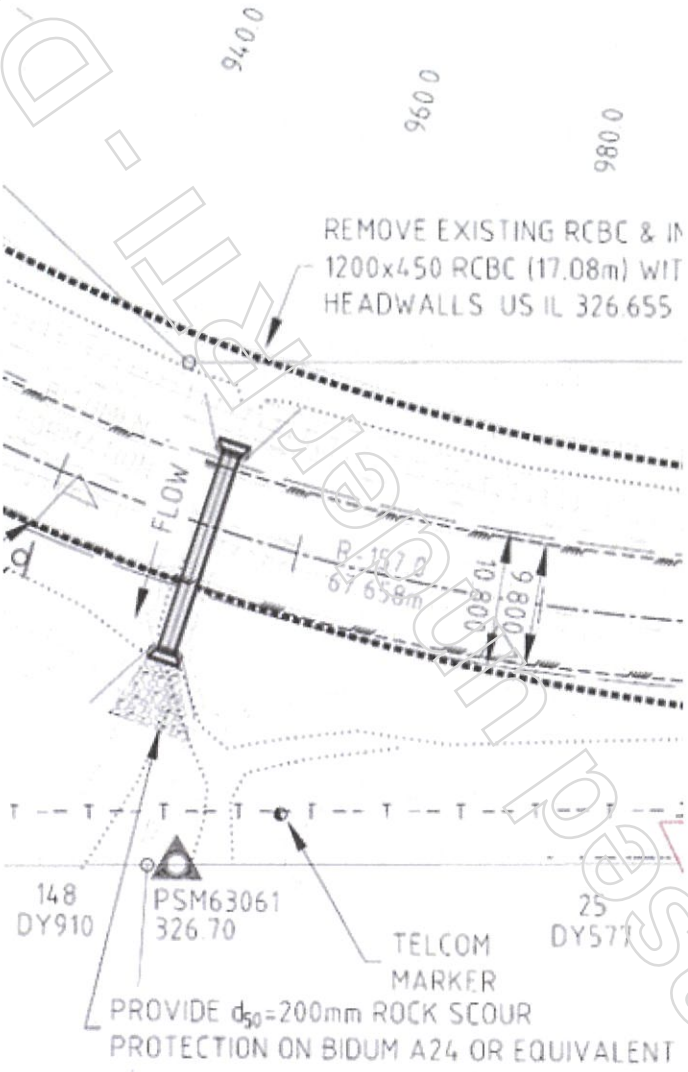
Best Regards

NR

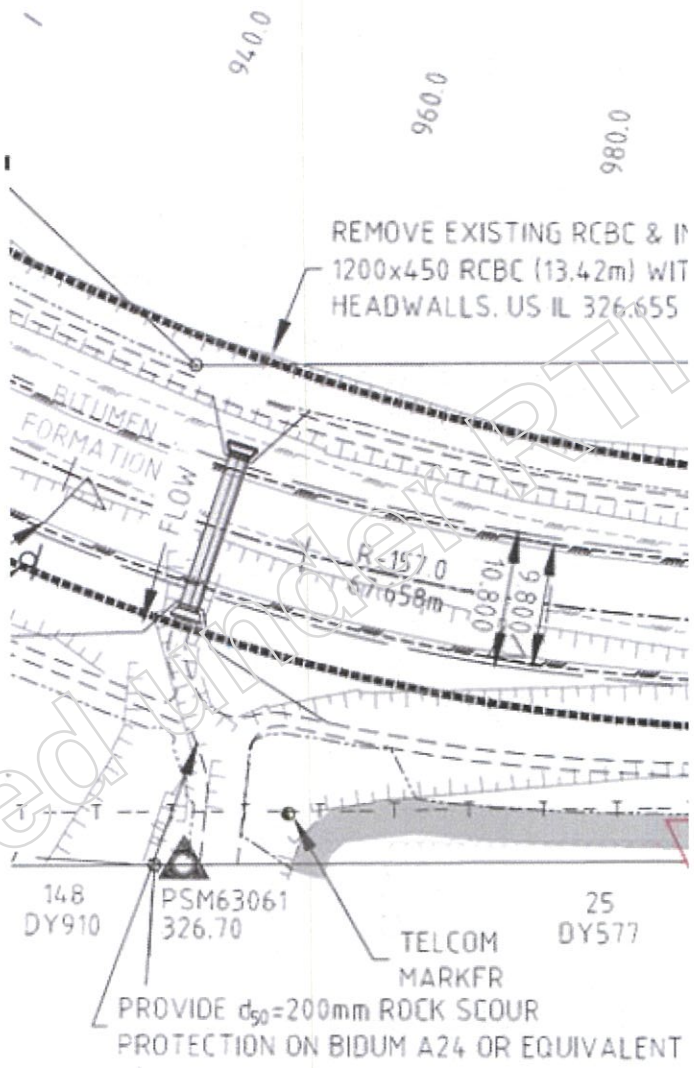
Project Engineer - Roads
Project Services
Arrow Energy Pty Ltd
Level 37, 111 Eagle St, Brisbane QLD 4000
GPO Box 5262, Brisbane QLD 4001, Australia
T: NR
M:
NR @arrowenergy.com.au
www.arrowenergy.com.au

Important: This message may contain confidential information. If you are not the intended recipient or you received the message in error, you must immediately delete the message and notify the sender.

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DTMR - Unpublished - Released



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Item

ITEM DETAILS

Item ID:	282278 - PDO	**Item Type:**	Email
Date Created:	06/09/2022	**Project ID:**	
Date Captured:	06/09/2022	**Sub Project ID:**	
Item Format:	Electronic	**Other Reference:**	
Circulation:		**Copies Sent To:**	DD_PP&CM_CM_All, DD_PP&CM_DF_All
Subject:	SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)		
Function Term:	ROAD NETWORK MANAGEMENT	**Activity Term:**	ROAD CORRIDOR MAJOR WORKS
Container Title:	Arrow Energy - Daandine Gathering Pipeline - 1 x Gas, 1 x Water - Daandine-Nandi Rd & Dalby Kogan Rd	**Container ID:**	500/01375 [1]

ACTIONS & OWNERSHIP

Author:	NR	**Corporate Author:**	
Author Title / Position:	Project Engineer - Roads Project Services	**Complaint Classification:**	
Business Unit:	Arrow Energy Pty Ltd		
Action Officer:	Linda M Arnold	**Action Required:**	Action Completed
		Action Date:	06/09/2022
Actioned Date:	07/09/2022		
Home Location:	DDD_Warwick Records	**Last Movement Date:**	06/09/2022

SECURITY & ACCESS

Security Classification:	UNCLASSIFIED INFORMATION
Security Access:	Unrestricted

ADDITIONAL INFORMATION

Description / Additional Info:

Linda Arnold was advised on the 7/09/2022 Lachlan Jones has contacted NR

DOCUMENT CONTENTS

SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)

Released under RTI - DTMR

Subject SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)
From NR @arrowenergy.com.au
To DD.Works.Access@tmr.qld.gov.au
Cc Lachlan.S.Jones@tmr.qld.gov.au, Christopher.R.Green@tmr.qld.gov.au, downsswr.office@tmr.qld.gov.au, NR @arrowenergy.com.au
Bcc
Sent 6/09/2022 1:44:44 PM
Attached

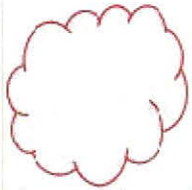

image001.png


image002.jpg


image003.jpg

Hi Lachlan,

Please can you provide us an update on TMR?s review and approval of the shortened culvert and locally steepened batters?

Thanks ?

NR

From: NR
Sent: Wednesday, 24 August 2022 4:17 PM
To: downsSWR.office@tmr.qld.gov.au
Cc: Lachlan S Jones <Lachlan.S.Jones@tmr.qld.gov.au>; NR @arrowenergy.com.au>; NR <NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @brandoneng.com>; christopher.r.green@tmr.qld.gov.au
Subject: RE: SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)

Released under RTI - DTMR

Hi Lachlan,

Further to the below and our telecon earlier today, herewith some background notes as requested by you to assist your reviewers understand the changes made.

- TMR?s Conditional approval of road works upgrading sections of Daandine Nandi Road was issued to Arrow on 1 July 2021, TMR Ref. TMR20-031252.
    - A meeting was held with the landholders for properties downstream of the culvert and representatives from WDRC and TMR on site on Wed 02/02/2022, after construction had already started.
    - The landholders were dissatisfied with the proposed extension of the culvert, which was to suit the wider road embankment. With construction of the culvert freshly started and base slab in place, the landholders got the impression that the flow regime was changing and insisted this be rectified.
    - The landholders in attendance were NR and NR
    - The TMR rep attending this meeting was Steve Luther. He was standing in for Chris Green who was NR NR
    - There does not appear to be any written record of the meeting outcome, but suffice to say it was agreed between the parties to pull the culvert back and locally steepen the batters for the outlet channels to better match the pre-construction condition and appease the landholders.

You can see the effect of the culvert outlet being pulled back in the snippets below:

Snippet of S00B01-ARW-CIV-LAY-0051 **Rev 0**	Snippet of S00B01-ARW-CIV-LAY-0051 **Rev 1**

Most the drawings should have revision clouds on the changes.

Please let me know if you need any further information.

Best Regards

NR

Released under RTI - DTMR

From: NR

Sent: Wednesday, 24 August 2022 10:06 AM

To: downsSWR.office@tmr.qld.gov.au

Cc: Lachlan S Jones <Lachlan.S.Jones@tmr.qld.gov.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @arrowenergy.com.au>; NR @brandoneng.com>

Subject: SGP - Daandine Nandi Road Section 1 - Revised Drawings for Review (Ch 960 Culvert)

Hi Lachlan,

For DTMR?s review please see ATTACHED copies of the B&A?s revised IFC drawings for Daandine Nandi Road Section 1 showing the shortened cross-drainage culvert at Ch 960 and localised steepening of the batters to suit.

Contractor Drg No	Arrow Drg No	Drawing Title/Description	Rev
201237 C000	S00B01-ARW-CIV-DET-0056	DNR-S1 LOCALITY PLAN	3
201237 C112	S00B01-ARW-CIV-LAY-0051	DNR-S1 LAYOUT SHEET 3 OF 6	1
201237 C120	S00B01-ARW-CIV-DET-0057	DNR-S1 TYPICAL SECTIONS AND DETAILS	3
201237 C121	S00B01-ARW-CIV-DET-0058	DNR-S1 DRAINAGE DETAILS	2
201237 C131	S00B01-ARW-CIV-LSN-0030	DNR-S1 LONGITUDINAL SECTIONS SHEET 2 OF 7	2
201237 C142	S00B01-ARW-CIV-CRS-0036	DNR-S1 CROSS SECTIONS SHEET 3 OF 11	2

The changes reflect what was discussed with Steve Luther in the meeting with landholders on site earlier this year. We request that you review the same and confirm DTMR?s acceptance of the changes at the earliest opportunity.

A copy of the hydraulic modelling report prepared by Water Technology to confirm there is no material impact to the adjoining landholders is available on request.

Please do not hesitate to contact us should you have any questions or concerns.

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Best Regards

NR
Project Engineer - Roads
Project Services
Arrow Energy Pty Ltd
Level 37, 111 Eagle St, Brisbane QLD 4000
GPO Box 5262, Brisbane QLD 4001, Australia
T: NR
M NR
NR @arrowenergy.com.au
www.arrowenergy.com.au

Important: This message may contain confidential information. If you are not the intended recipient or you received the message in error, you must immediately delete the message and notify the sender.

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Queensland Government

Department of Transport and Main Roads

Our ref: TMR18-023895
Your ref
Enquiries Bernie-Anne Freeman

16 April 2018

Arrow Land Holdings Pty Ltd
GPO Box 5262
Brisbane QLD 4000

Dear NR

Authority to Commence Approved Road Works

I refer to your application for road works between Lot 26/DY771 and Daandine – Nandi Road.

Thank you for forwarding the documents required as conditions of your Road Works approval.

This approval is only effective for the works described and the period it is issued for. It may not be extended and is not transferable. Any change of contractors will require a new authority before work can commence. If any variations from the approved works are required (including the construction of a temporary access to the site), written approval from the department must first be obtained.

The department will provide a Certificate of Practical Completion when the finalisation of works has been confirmed as per the conditions of approval.

If you require further information about your application, I encourage you to contact Bernie-Anne Freeman on 07 4639 0815.

NR

Yours sincerely
Bernie-Anne Freeman
Engineer - Civil
Program Delivery and Operations

Program Delivery and Operations

Queensland
Queensland

Telephone +61 7
Facsimile +61 7
Website www.tmr.qld.gov.au
ABN: 39 407 690 291

Released under RTI - DTMR

Item

ITEM DETAILS

Item ID:	129668 - PDO	**Item Type:**	Letter
Date Created:	08/06/2018	**Project ID:**	
Date Captured:	02/07/2018	**Sub Project ID:**	
Item Format:	Physical	**Other Reference:**	TMR18-023895
Circulation:		**Copies Sent To:**	
Subject:	Certificate of Completion - Lot 26/DY771 Daandine-Nandi Road		
Function Term:	ROAD NETWORK MANAGEMENT	**Activity Term:**	ROAD CORRIDOR MINOR WORKS
Container Title:	Road Access - Darling Downs District - 2018	**Container ID:**	500/01103 [1]

ADDRESSEE

Name:	Arrow Land Holdings Pty Ltd	**Address:**	GPO BOX 5262 Brisbane QLD 4000

ACTIONS & OWNERSHIP

Author:	Bernie-Anne J Freeman	**Corporate Author:**	
Author Title / Position:	Engineer (Civil)	**Complaint Classification:**	
Business Unit:	Delivery / Delivery Team		
Action Officer:			
Home Location:	DSWR_Warwick Records	**Last Movement Date:**	02/07/2018

SECURITY & ACCESS

Security Classification:	UNCLASSIFIED INFORMATION	
Security Access:	Unrestricted	

ADDITIONAL INFORMATION

Description / Additional Info:

Attached is a legible, scanned image. The original physical public record is located on the physical container.

scanned for workflow purposes

DOCUMENT CONTENTS

Authority to Commence Approved Road Works..pdf

Released under RTI DTMR

Queensland Government

Road Works in a State-controlled road Application

(for applications not associated with conditions of development approval)

Before any **road works** can be undertaken within a State-controlled road, written approval is required from the Department of Transport and Main Roads. It is an offence under s33 of the *Transport Infrastructure Act 1994* (the Act) to carry out road works on a State-controlled road without written approval. **Road works** as defined by the Act include works done for establishing or constructing roads or things associated with roads.

Note:

- The department is not responsible for relocating any services (electricity, telecommunication, drainage pits, and so on).
- The department may refuse to grant an approval or revoke an approval where the applicant has not provided true or correct information in their application.

1. Applicant's details

Name/company

Arrow Energy Pty Ltd

Address

Level 39, 111 Eagle St, Brisbane QLD 4000

GPO Box 5262, Brisbane QLD 4001 Postcode

Telephone number	Mobile number	Email address
NR		info@arrowenergy.com.au

2. Description of the proposed road works

Please provide details (including location) of works you intend to carry out (provide detailed plans and diagrams). Attach any necessary supporting information (refer to Information for Applicants on page 2 of this form for assistance with the type of information required).

To undertake watering for dust suppression (only as required) on Daandine Nandi Road during and upcoming construction and drilling campaign from the intersection of Dalby Kogan Rd and Daandine Nandi Rd south to southern boundary of Lot 15DY33.

3. Declaration

I/We the applicant(s):

- request approval of the proposed **road works** under s33 of the Act
- warrant that the information provided in/or attached to this application is true and accurate to the best of my/our knowledge.

For individual applicants

Signature

Date / /

For corporate applicants

executed in accordance with s127 of the *Corporations Act 2001* (Cth)

Company name: Arrow Energy Pty Ltd

Australian Company Number (ACN): 078 521 936

Name: NR

Position: ~~Chief Financial Officer~~ Director

Signature: NR Date: 11 / 10 / 2019

Name: NR

Position: Company Secretary

Signature: NR Date: 11 / 10 / 2019

Where the applicant is not an individual or a company, such as an incorporated association, please modify the execution block to suit.

Privacy statement - The department is collecting the information on this form for the purposes of assessing proposed **road works** in accordance with the Act. Your personal details will not be disclosed to any other third party without your consent unless required by law.

continued page 2...

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Information for applicants

Road works approvals (s33 of the Act)

The information that is required by the department to assess an application for **road works** approval will largely depend upon the site and scale of the **road works** to be constructed. Detailed design of the **road works** consistent with the requirements of the conditions of approval, conforming to the requirements of the department's *Road Planning and Design Manual* and certified by a Registered Professional Engineer of Queensland (RPEQ) may be necessary. The following list provides examples of the types of issues that may need to be addressed in the detailed design:

- horizontal and vertical alignment of the works
- cross sections
- property accesses
- drainage design
- sight distances
- pavement design
- relocating utilities
- signage and pavement markings
- speed environment.

Contact your local departmental office if you require further assistance with determining what is required to be included in your application.

The approval process takes time

The applicant should ensure sufficient time is allowed for the department to assess the application. The department will use its best endeavours to respond within 10 business days with either:

i. an acknowledgement of your application
ii. a request for further information
iii. a notice of decision of your application.

The type of initial response the applicant will receive will depend on the complexity of the application and the information provided.

An approval may be conditional

The application **must** be consistent with the relevant development approval and meet the department's design requirements. Where this occurs, the applicant will receive a 'Letter of Conditional Approval'. **This does not authorise works to commence.** The 'Letter of Conditional Approval' contains conditions which must be met before the works can be constructed.

Once the department is satisfied the conditions have been complied with, the applicant will receive an 'Authority to Commence Works'.

Conditions that may be imposed

Before the department will approve an application, it will generally require:

- that the construction work is to proceed without unreasonable interruption to traffic. This may include the requirement for a Construction Workplace Plan, including a Traffic Management Plan. Any traffic control will need to be undertaken by a company which is registered under the Traffic Management Registration Scheme. Refer to http://www.tmr.qld.gov.au/business-industry/Accreditations/Traffic-Management-Registration-Scheme.
- details of your contractor. You must be able to demonstrate your nominated contractor has sufficient expertise to carry out the proposed work.
- that the nominated contractor indemnify the department from any liability connected with the works.
- that the nominated contractor has an appropriate level of public liability insurance cover. The nominated contractor may also be required to provide a copy of the policy and/or certificates of insurance.
- that the applicant be responsible for rectifying any negative impacts on the road corridor caused by or connected with carrying out the works, such as environmental damage and/or matters affecting public safety.
- that the applicant is responsible for identifying and complying with all other laws and requirements which may relate to carrying out works or activities.
- that the applicant pay a bond to the department.

It is the applicant's responsibility to ensure that all conditions of approval given by the department are complied with.

Applicants should contact the department if they require any assistance with understanding what they are required to do before they undertake approved works.

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continued page 3...

Assistance with or lodgement of application

To lodge your application or if you require any assistance with finalising your application, contact the Corridor Management team in your local departmental office. To find out which is your local office, call 13 23 80 or go to www.tmr.qld.gov.au/About-us/Contact-us/In-person/Roads-offices.aspx.

Office	Email	Phone
Barcaldine	barcaldine.office@tmr.qld.gov.au	4651 2777
Rockhampton	corridormanagement@tmr.qld.gov.au	4931 1559
Roma	southwest.office@tmr.qld.gov.au	4622 9511
Toowoomba	downsswr.office@tmr.qld.gov.au	4639 0777
Cairns	cairns.office@tmr.qld.gov.au	4045 7144
Mackay	mackay.whitsunday.idas@tmr.qld.gov.au	4951 8555
Brisbane	metropolitan.idas@tmr.qld.gov.au	3066 6762
Maroochydore	northcoast@tmr.qld.gov.au	5451 7055
Cloncurry	cloncurry.corridor@tmr.qld.gov.au	4769 3200
Townsville	north.queensland.idas@tmr.qld.gov.au	4421 8700
Gold Coast	scrcmallocations@tmr.qld.gov.au	5563 6600
Bundaberg	WBB.idas@tmr.qld.gov.au	4154 0200

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Dust Suppression - Daandine Nandi Road



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Legend

- Actual PL Boundary
- Actual ATP Boundary
- Highway
- Qld Road Network
  - 4WD and Tracks
  - Bikeways/Walkways
  - Freeways/Motorways
  - Highways
  - Local Connector Roads
  - Private or Restricted Roads
  - Secondary Roads
  - Street/Local - only provides property acc
  - Unconstructed and/or dedicated
- Queensland Rail - Rail Centre Lin
- Queensland Rail - Rail Corridor
- Qld Rail Network (DERM)
- State Controlled Roads
- DCDB (Easements)
- DCDB (Property Boundaries)
  - Ownership Information Available
  - No Information Available
- SB Imagery AAM 2014
- BB MGP Grosvenor Imagery 2019
- BB Imagery AAM 2014
- BB Imagery Fugro 2012

Notes

2.1 0 1.07 2.1 Kilometers

Print Date: 20/9/2019

DISCLAIMER: While all reasonable care has been taken to ensure the information contained on this map is upto date and accurate no warranty is given that the information contained on this map is free from error or omission. Any reliance placed on such information shall be at the sole risk of the user. Please verify the accuracy of all information prior to using it. NOTE: The information shown on this map is a copyright of Arrow Energy Limited and where applicable its affiliates and Co-venturers.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Item

ITEM DETAILS

Item ID:	153189 - PDO	**Item Type:**	Letter
Date Created:	07/08/2018	**Project ID:**	
Date Captured:	22/11/2018	**Sub Project ID:**	
Item Format:	Physical	**Other Reference:**	TMR18-023895
Circulation:		**Copies Sent To:**	
Subject:	Authority to Commence - Daandine Nandi road Chainage 0.15 to 3.52km		
Function Term:	ROAD NETWORK MANAGEMENT	**Activity Term:**	ROAD CORRIDOR MINOR WORKS
Container Title:	Road Access - Darling Downs District - 2018	**Container ID:**	500/01103 [1]

ADDRESSEE

Name:	NR	**Address:**	Arrow Land Holdings Pty Ltd GPO Box 5262, Brisbane 4000

ACTIONS & OWNERSHIP

Author:	Bernie-Anne J Freeman	**Corporate Author:**	
Author Title / Position:	Engineer (Civil)	**Complaint Classification:**	
Business Unit:	Delivery / Delivery Team		
Action Officer:			
Home Location:	DSWR_Warwick Records	**Last Movement Date:**	22/11/2018

SECURITY & ACCESS

Security Classification:	UNCLASSIFIED INFORMATION
Security Access:	Unrestricted

ADDITIONAL INFORMATION

Description / Additional Info:

DOCUMENT CONTENTS

PDF

Authority to Commence Approved Works - Daandine Nandi Road - TMR18-023895.pdf

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Our ref TMR18-023895
Your ref
Enquiries Bernie-Anne Freeman

Queensland Government

7 August 2018

Department of Transport and Main Roads

Arrow Land Holdings Pty Ltd
GPO Cox 5262
Brisbane QLD 4000

Dear NR

Authority to Commence Approved Road Works

I refer to your application for road works (maintenance) on the Daandine Nandi Road, Chainage 0.15 to 3.52km.

Thank you for forwarding the documents required as conditions of your Road Works approval.

Pursuant to section 33 of the *Transport Infrastructure Act 1994,* approval is given to commence work.

This approval is only effective for the works described and the period it is issued for. It may not be extended and is not transferable. Any change of contractors will require a new authority before work can commence. If any variations from the approved works are required (including the construction of a temporary access to the site), written approval from the department must first be obtained.

The department will provide a Certificate of Practical Completion when the finalisation of works has been confirmed and the department accepts the works on maintenance. Any bond held will be returned when the "on-maintenance" period for the works has expired and the "as constructed" plans have provided to the department.

If you require further information about your application, I encourage you to contact Bernie-Anne Freeman, by email at Bernie-Anne.J.Freeman@tmr.qld.gov.au or on 07 4639 0815.

Yours sincerely

NR

Bernie-Anne Freeman
Engineer (Civil)

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Program Delivery and Operations

Queensland
Queensland

Telephone +61 7
Facsimile +61 7
Website www.tmr.qld.gov.au
ABN: 39 407 690 291

Queensland Government

Department of
Transport and Main Roads

Our ref TMR20-031252
Your ref Job No.201237 and 201238
Enquiries Lachlan Jones

13 September 2022

Arrow Energy Pty Ltd
GPO Box 5262
Brisbane QLD 4001

Dear NR

Conditional approval of road works at Daandine Nandi Road (CH 0-3.5km & Ch 7.9km -11.8km) – AMENDED

This is not an authorisation to commence work on a state-controlled road

I refer to your application for road works made pursuant to section 33 of the *Transport Infrastructure Act 1994* (TIA) for works at the above location.

The Department of Transport and Main Roads (the department) has assessed your application, including the following plans:

- Pavement Design Report (P10646), Version 2 (dated 31/05/2021) provided by Harrison Infrastructure Group (NR to Brandon and Associates.

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Program Delivery and Operations
Southern Queensland Region
Floor 2 1-5 Phillip Street Toowoomba QLD 4350
Locked Bag 1 Warwick QLD 4370

Telephone +61 7 (07) 4639 0759
Website www.tmr.qld.gov.au
Email Downs.South.West.IDAS@tmr.qld.gov.au
ABN: 39 407 690 291

B&A REFERENCE NO.	ARROW DOCUMENT NO.	DOCUMENT TITLE	
201238 C000	S00B01-ARW-CIV-DET-00061	Locality Plan	0
201238 C101	S00B01-ARW-CIV-SUR-00020	Survey Sheet 1 of 7	0
201238 C102	S00B01-ARW-CIV-SUR-00021	Survey Sheet 2 of 7	0
201238 C103	S00B01-ARW-CIV-SUR-00022	Survey Sheet 3 of 7	0
201238 C104	S00B01-ARW-CIV-SUR-00023	Survey Sheet 4 of 7	0
201238 C105	S00B01-ARW-CIV-SUR-00024	Survey Sheet 5 of 7	0
201238 C106	S00B01-ARW-CIV-SUR-00025	Survey Sheet 6 of 7	0
201238 C107	S00B01-ARW-CIV-SUR-00026	Survey Sheet 7 of 7	0
201238 C110	S00B01-ARW-CIV-LAY-00058	Layout Sheet 1 of 7	0
201238 C111	S00B01-ARW-CIV-LAY-00059	Layout Sheet 2 of 7	0
201238 C112	S00B01-ARW-CIV-LAY-00060	Layout Sheet 3 of 7	0
201238 C113	S00B01-ARW-CIV-LAY-00061	Layout Sheet 4 of 7	0
201238 C114	S00B01-ARW-CIV-LAY-00062	Layout Sheet 5 of 7	0
201238 C115	S00B01-ARW-CIV-LAY-00063	Layout Sheet 6 of 7	0
201238 C116	S00B01-ARW-CIV-LAY-00064	Layout Sheet 7 of 7	0
201238 C117	S00B01-ARW-CIV-LAY-00065	Duleen-Daandine Road Intersection Layout	0
201238 C120	S00B01-ARW-CIV-DET-00062	Typical Sections and Details Sheet 1 of 2	0
201238 C121	S00B01-ARW-CIV-DET-00063	Typical Sections and Details Sheet 2 of 2	0
201238 C125	S00B01-ARW-CIV-DET-00064	Drainage Detail	0
201238 C130	S00B01-ARW-CIV-LSN-00036	Longitudinal Sections Sheet 1 of 8	0
201238 C131	S00B01-ARW-CIV-LSN-00037	Longitudinal Sections Sheet 2 of 8	0
201238 C132	S00B01-ARW-CIV-LSN-00038	Longitudinal Sections Sheet 3 of 8	0
201238 C133	S00B01-ARW-CIV-LSN-00039	Longitudinal Sections Sheet 4 of 8	0
201238 C134	S00B01-ARW-CIV-LSN-00040	Longitudinal Sections Sheet 5 of 8	0
201238 C135	S00B01-ARW-CIV-LSN-00041	Longitudinal Sections Sheet 6 of 8	0
201238 C136	S00B01-ARW-CIV-LSN-00042	Longitudinal Sections Sheet 7 of 8	0
201238 C137	S00B01-ARW-CIV-LSN-00043	Longitudinal Sections Sheet 8 of 8	0
201238 C140	S00B01-ARW-CIV-CRS-00045	Cross Sections Sheet 1 of 10	0
201238 C141	S00B01-ARW-CIV-CRS-00046	Cross Sections Sheet 2 of 10	0
201238 C142	S00B01-ARW-CIV-CRS-00047	Cross Sections Sheet 3 of 10	0
201238 C143	S00B01-ARW-CIV-CRS-00048	Cross Sections Sheet 4 of 10	0
201238 C144	S00B01-ARW-CIV-CRS-00049	Cross Sections Sheet 5 of 10	0
201238 C145	S00B01-ARW-CIV-CRS-00050	Cross Sections Sheet 6 of 10	0
201238 C146	S00B01-ARW-CIV-CRS-00051	Cross Sections Sheet 7 of 10	0
201238 C147	S00B01-ARW-CIV-CRS-00052	Cross Sections Sheet 8 of 10	0
201238 C148	S00B01-ARW-CIV-CRS-00053	Cross Sections Sheet 9 of 10	0
201238 C149	S00B01-ARW-CIV-CRS-00054	Cross Sections Sheet 10 of 10	0
201238 C160	S00B01-ARW-CIV-LAY-00066	Vehicle Swept Paths Layout Sheet 1 of 2	0
201238 C161	S00B01-ARW-CIV-LAY-00067	Vehicle Swept Paths Layout Sheet 2 of 2	0
201238 C170	S00B01-ARW-CIV-DET-00065	Control Line Setout Details	0
201238 C180	S00B01-ARW-CIV-DET-00066	Erosion and Sediment Control Details	0
	S00B01-ARW-CIV-REP-00034	Pavement Design Report	
	S00B01-ARW-CIV-REP-00035	Safety in Design Report	
	S00B01-ARW-CIV-REP-00036	Design Exception Report	
	S00B01-ARW-CIV-BUD-00007	Construction Cost Estimate	
	S00B01-ARW-CIV-MTO-00011	Bill of Quantities	
	S00B01-ARW-CIV-SPR-00007	Specification	

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B&A REFERENCE No.	ARROW DOCUMENT No.	DOCUMENT TITLE	
201237 C000	S00B01-ARW-CIV-DET-00056	Locality Plan	3
201237 C101	S00B01-ARW-CIV-SUR-00014	Survey Sheet 1 of 6	0
201237 C102	S00B01-ARW-CIV-SUR-00015	Survey Sheet 2 of 6	0
201237 C103	S00B01-ARW-CIV-SUR-00016	Survey Sheet 3 of 6	0
201237 C104	S00B01-ARW-CIV-SUR-00017	Survey Sheet 4 of 6	0
201237 C105	S00B01-ARW-CIV-SUR-00018	Survey Sheet 5 of 6	0
201237 C106	S00B01-ARW-CIV-SUR-00019	Survey Sheet 6 of 6	0
201237 C110	S00B01-ARW-CIV-LAY-00049	Layout Sheet 1 of 6	0
201237 C111	S00B01-ARW-CIV-LAY-00050	Layout Sheet 2 of 6	0
201237 C112	S00B01-ARW-CIV-LAY-00051	Layout Sheet 3 of 6	1
201237 C113	S00B01-ARW-CIV-LAY-00052	Layout Sheet 4 of 6	0
201237 C114	S00B01-ARW-CIV-LAY-00053	Layout Sheet 5 of 6	0
201237 C115	S00B01-ARW-CIV-LAY-00054	Layout Sheet 6 of 6	0
201237 C116	S00B01-ARW-CIV-LAY-00055	Theten Road Intersection Layout	0
201237 C120	S00B01-ARW-CIV-DET-00057	Typical Cross Sections and Details	3
201237 C121	S00B01-ARW-CIV-DET-00058	Drainage Details	2
201237 C130	S00B01-ARW-CIV-LSN-00029	Longitudinal Section Control Line RS01 Sheet 1 of 7	0
201237 C131	S00B01-ARW-CIV-LSN-00030	Longitudinal Section Control Line RS01 Sheet 2 of 7	2
201237 C132	S00B01-ARW-CIV-LSN-00031	Longitudinal Section Control Line RS01 Sheet 3 of 7	0
201237 C133	S00B01-ARW-CIV-LSN-00032	Longitudinal Section Control Line RS01 Sheet 4 of 7	0
201237 C134	S00B01-ARW-CIV-LSN-00033	Longitudinal Section Control Line RS01 Sheet 5 of 7	0
201237 C135	S00B01-ARW-CIV-LSN-00034	Longitudinal Section Control Line RS01 Sheet 6 of 7	0
201237 C136	S00B01-ARW-CIV-LSN-00035	Longitudinal Section Control Line RS01 Sheet 7 of 7	0
201237 C140	S00B01-ARW-CIV-CRS-00034	Cross Sections Control Line RS01 Sheet 1 of 11	0
201237 C141	S00B01-ARW-CIV-CRS-00035	Cross Sections Control Line RS01 Sheet 2 of 11	0
201237 C142	S00B01-ARW-CIV-CRS-00036	Cross Sections Control Line RS01 Sheet 3 of 11	2
201237 C143	S00B01-ARW-CIV-CRS-00037	Cross Sections Control Line RS01 Sheet 4 of 11	0
201237 C144	S00B01-ARW-CIV-CRS-00038	Cross Sections Control Line RS01 Sheet 5 of 11	0
201237 C145	S00B01-ARW-CIV-CRS-00039	Cross Sections Control Line RS01 Sheet 6 of 11	0
201237 C146	S00B01-ARW-CIV-CRS-00040	Cross Sections Control Line RS01 Sheet 7 of 11	0
201237 C147	S00B01-ARW-CIV-CRS-00041	Cross Sections Control Line RS01 Sheet 8 of 11	0
201237 C148	S00B01-ARW-CIV-CRS-00042	Cross Sections Control Line RS01 Sheet 9 of 11	0
201237 C149	S00B01-ARW-CIV-CRS-00043	Cross Sections Control Line RS01 Sheet 10 of 11	0
201237 C150	S00B01-ARW-CIV-CRS-00044	Cross Sections Control Line RS01 Sheet 11 of 11	0
201237 C160	S00B01-ARW-CIV-LAY-00056	Vehicle Swept Paths Sheet 1 of 2	0
201237 C161	S00B01-ARW-CIV-LAY-00057	Vehicle Swept Paths Sheet 2 of 2	0
201237 C170	S00B01-ARW-CIV-DET-00059	Control Line Setout Details	0
201237 C180	S00B01-ARW-CIV-DET-00060	Erosion and Sediment Control Details	0
	S00B01-ARW-CIV-REP-00004	Pavement Design Report	
	S00B01-ARW-CIV-REP-00021	Safety In Design Report	
	S00B01-ARW-CIV-REP-00022	Design Exception Report	
	S00B01-ARW-CIV-BUD-00006	Estimate of Construction Cost	
	S00B01-ARW-CIV-MTO-00010	BOQ	
	S00B01-ARW-CIV-SPR-00006	Specifications	
	S00B01-ARW-CIV-REP-00029	Gap Analysis Report	

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The department advises that it has decided to approve the application, subject to the following conditions:

No.	Conditions of Approval	Condition Timing
Road Works		
A. General		
1	a. Road Works comprising upgrading sections 1 and 3 of the Daandine Nandi Road shall be undertaken in accordance with the above issued for construction plans. b. Up-stream and down-stream flood immunity post upgrading works is required to be maintained to pre upgrading flood immunity levels and to maintain no worsening storm water impacts. Spot survey levels pre and post developed works shall be provided to confirm that finish levels remain the same. c. Consultation on the impacts of the proposed works shall be undertaken to ensure the local community and elected representatives are aware of changed traffic conditions on both a permanent and temporary basis. This includes stakeholder engagement with respect to consulting on direct property accesses impacted by the proposed upgrading works on both a temporary and permanent nature. Community engagement is to commence a minimum of one (1) month prior to Daandine Nandi Road upgrading works commencing Community engagement is also required to be undertaken during any temporary changes to ensure safe and efficient movement of traffic through the affected area. Community engagement/information depending on the scope of works and impact on the public shall be undertaken generally in accordance with "Community Engagement Developer Works" document (attached). All proposed communication material and any reference to TMR on any publicity release is required to be sent to Department of Transport and Main Roads for review before distribution. TMR will review and approve material prior to distribution. Developer is required to provide evidence outlining all community consultation undertaken. As these upgrading works are third party works, All costs and community engagement are at the developers (arrow) expense and responsibility. d. Developers responsibility to locate and protect existing high	Construction of road works must not commence until the prestart meeting has concluded and an 'Authority to Commence Works' has been issued.

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No.	Conditions of Approval	Condition Timing
	pressure gas main located within the works extents area both during and post construction of road works. Protection measures and gas main details shall be RPEQ certified and marked on as constructed drawings.	
2	All road works are to be carried out in accordance with TMR's specifications and standards.	Prior to commencement of use.
3	This conditional approval is valid for one year from the date of this letter.	At all times.
4	The Road Works are to be constructed at no cost to TMR.	At all times.
5	TMR officers are to be allowed access to the project site for the purpose of ensuring compliance with TMR's conditions.	At all times during construction.
6	Any damage to the existing road infrastructure caused by carrying out the Road Works is to be rectified/repaired at no cost to TMR.	Prior to TMR issuing 'Certificate of Completion'.
7	A security in accordance with the attached factsheet titled, Bonds or Security Deposits required by a Road Works Approval (under section 33 of the Transport Infrastructure Act 1991) is to be lodged with the TMR office in Toowoomba. The security is to be provided as two documents – one for 50% of the security amount and the other for 50% of the security amount. The bond provided must be any of the following: • Cash; • An unconditional, irrevocable bank guarantee using TMR form F5086 (attached) for a bank approved by TMR; or • An unconditional, irrevocable insurance bond using TMR form F5087 (attached) from an insurance company approved by TMR. Recourse to bond – TMR may convert into money at any time such part of the Security provided that does not consist of money. TMR will not be liable in any way for any loss occasioned by the conversion of any part of the Security into money.	Prior to Prestart Meeting.
B. Documents for Approval		
8	All TMR Technical Specifications are to be read in conjunction with 'MRTS01 Introduction to Technical Specifications' (including annexure).	At all times.
9	An Erosion and Sediment Control Plan (ERSCP) in accordance with TMR's specification 'MRTS52 Environment Management' is to be submitted to TMR for approval.	Prior to Prestart Meeting.
10	A traffic control permit (TCP) is required from Transport and Main	Prior to Prestart Meeting.

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No.	Conditions of Approval	Condition Timing
	Roads (TMR) to access and occupy the state-controlled road (SCR). The applicant is required to engage the services of a registered Traffic Management Company (TMC) to undertake on their behalf the design and implementation for works on a SCR. Applications to be submitted through the Permit for Access to Road and Corridor Online System (PARC) for approval. The TMC must include: • Traffic Management Plan (If applicable) • Traffic Guidance Scheme/s • TMR Reference • Supporting Documentation from Third Party applicant • Copy current Public Liability Insurance • Copy signed Deed of Indemnity • Copy of this Conditional Approval	
11	A Construction Management Plan (CMP) in accordance with TMR's 'Road Planning and Design Manual' is to be submitted to TMR for approval.	Prior to Prestart Meeting.
12	An Environment Management Plan (EMP) in accordance with TMR specification 'MRTS51 Environment Management' is to be submitted to TMR for approval.	Prior to Prestart Meeting.
13	A Quality Management Plan (QMP) in accordance with TMR specification 'MRTS50 Specific Quality System Requirements' must be submitted to TMR for approval. The QMP must include, but is not limited to, the following details: a) All Hold Points, Witness Points and Milestones b) Testing frequencies, lot sizes and numbers c) Name and address of laboratory, accredited by the National Association of Testing Authorities (NATA), carrying out samplings Note: at least 24 hours notice is to be given to TMR advising of required inspections.	Prior to Prestart Meeting.
C. Principal Contractor		
14	A completed 'Principal Contractors Details and Bond Estimate' form F5084 (attached) is to be completed and returned to TMR. The nominated principal contractor must have sufficient expertise to carry out the proposed road works and hold a current public liability insurance policy that notes TMR's interest in the amount of not less than $20 million.	Prior to TMR issuing an 'Authority for Prestart Meeting'.
15	A completed 'Deed of Indemnity' for the Road Works (completed by the Principal Contractor) using TMR form F5109 (attached) is to be submitted to TMR.	Prior to TMR issuing an 'Authority for Prestart Meeting'.
D. Prestart Meeting		

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No.	Conditions of Approval	Condition Timing
16	A Prestart meeting attended by the applicant's representative and/or the principal contractor and TMR's representative is to be held. The prestart meeting will include, but is not limited to, the following: a) Introduction of stakeholders. b) Review of road works approved drawings and management plans. c) Construction activities and program. d) Issues pertaining to a Zero Harm working environment. It is intended an 'Authority to Commence Works' will be issued at the Prestart meeting. To arrange a Prestart meeting, please contact Mahendra Mistry on 07 4639 0636 or mahendra.z.mistry@tmr.qld.gov.au.	A minimum of 10 business days prior to the commencement of the road works.
E. Practical Completion		
17	A 'Certificate of Practical Completion' of the Road Works by a Registered Professional Engineer of Queensland (RPEQ) is to be submitted. The 'Certificate of Practical Completion' must include, but is not limited to, the following details: a) Testing and inspection plans b) Documentation of dimensional check c) 'As constructed' plans.	Within five (5) days of the completion of the work.
F. Maintenance Period		
18	Any defect which develops in work within the limits of TMR's maintenance responsibility during the on-maintenance period must be rectified by the applicant at no cost to TMR. The defect liability period is eighteen months commencing from the date the letter of certificate of practical completion is received by this office.	Until TMR has formally accepted off-maintenance the portion of the works, if any, for which it will accept responsibility for future maintenance.

Important information for applicants

This approval does not authorise you to commence road works. Prior to any road works being undertaken within the boundary of the state-controlled road, the department must have issued you with an authority to commence works. The authority to commence works will not be issued until all the requirements of the above conditions have been fulfilled.

If any variations from the approved road works are required, further written approval from the department must first be obtained.

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You should also be aware that you may have other statutory obligations. This conditional approval is for the TIA only.

This document must be retained as evidence of the road works approval.

If you would like to discuss this application, please contact Lachlan Jones, Planning Officer by email at DD.Works.Access@tmr.qld.gov.au or on (07) 4639 0759.

Yours sincerely

NR

Jason McGuire
Senior Town Planner

Released under RTI - DTMR

From: Christopher R Green
To: Jeffrey J Lavey
Subject: FW: 21033 - DNS1S3 - PM32a (TMR) Bond Draft Request | 202108-0133 & 0134
Date: Wednesday, 12 July 2023 11:44:34 AM
Attachments: image002.png

Hi Jeff

As discussed, this was the approval for FKG to commence works on the Daandine-Nandi Rd Sections 1 and 3 widen and seal.

Let me know if you need further information.

Cheers

Chris

Chris Green
A/Senior Engineer (Civil) | Southern Queensland Region
Program Delivery And Operations | Infrastructure Management and Delivery Division
Department of Transport and Main Roads

P: (07) 4639 0623 | M: NR
Floor 3 | Toowoomba - Russell Street | 10 Russell Street | Toowoomba Qld 4350
Locked Bag 1 | Warwick Qld 4370
E: christopher.r.green@tmr.qld.gov.au
W: www.tmr.qld.gov.au

From: Christopher R Green
Sent: Wednesday, 25 August 2021 8:30 AM
To: NR @fkg.com.au>
Cc: 21010 Mailbox <21010.mailbox@fkg.com.au>; NR @fkg.com.au>
Subject: RE: 21033 - DNS1S3 - PM32a (TMR) Bond Draft Request | 202108-0133 & 0134

Thanks NR

Okay to commence works when you're ready.

Cheers

Chris

Chris Green
A/Senior Engineer (Civil) | Darling Downs District
Program Delivery And Operations | Department of Transport and Main Roads

Ground Floor | Toowoomba – Fountain View | 5 Kitchener Street | Toowoomba Qld 4350
Locked Bag 1 | Warwick Qld 4370
M: NR | P: (07) 4639 0623
E: christopher.r.green@tmr.qld.gov.au
W: www.tmr.qld.gov.au

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From: NR @fkg.com.au>
Sent: Tuesday, 24 August 2021 6:14 PM
To: Christopher R Green <Christopher.R.Green@tmr.qld.gov.au>
Cc: 21010 Mailbox <21010.mailbox@fkg.com.au>; NR @fkg.com.au>
Subject: FW: 21033 - DNS1S3 - PM32a (TMR) Bond Draft Request | 202108-0133 & 0134

Hi Chris,

Herewith copies of the TMR securities for Daandine Nandi Rd Sections 1 & 3.
Originals to be issued shortly.

Regards,

NR
Project Manager
Civil Engineering

M NR
E

Please consider the environment before printing this email

From NR @cfconnections.com.au <NR @cfconnections.com.au>
Sent: Tuesday, 24 August 2021 5:41 PM
To: NR @fkg.com.au>
Subject: FW: 21033 - DNS1S3 - PM32a (TMR) Bond Draft Request | 202108-0133 & 0134

EXTERNAL EMAIL: This email was sent from outside the organisation – be cautious, particularly with links and attachments.

Hi NR – I have been out. See attached. You should have originals tomorrow – worst case Thursday. Thanks NR

NR

Commercial Finance Connections
Linking opportunities with finance.....
NR
PO Box 2244, Brookside Centre Qld 4053
NR
NR *is a Credit Representative 400459 of BLSSA Pty Ltd, ACN 117 651 760 (Australian Credit Licence 391237)*

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Queensland Government

Department of
Transport and Main Roads

Our ref TMR20-031252
Your ref Job No.201237 and 201238
Enquiries Jeffrey Lavey

1 July 2021

Arrow Energy Pty Ltd
PO Box 36
Drayton North QLD 4350

Dear NR

Conditional approval of road works upgrading sections of Daandine Nandi Road (CH 0-3.5km & Ch 7.9km -11.8km) – AMENDED

This is not an authorisation to commence work on a state-controlled road

I refer to your application for road works made pursuant to section 33 of the *Transport Infrastructure Act 1994* (TIA) for works at the above location.

The Department of Transport and Main Roads (the department) has assessed your application, including the following documents and plans:

- Pavement Design Report (P10646), Version 2 (dated 31/05/2021) provided by Harrison Infrastructure Group (NR to Brandon and Associates.

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Program Delivery and Operations
Southern Queensland Region
Floor 2 1-5 Phillip Street Toowoomba QLD 4350
Locked Bag 1 Warwick QLD 4370

Telephone +61 7 (07) 4639 0828
Website www.tmr.qld.gov.au
Email Downs.South.West.IDAS@tmr.qld.gov.au
ABN: 39 407 690 291

B&A REFERENCE NO.	ARROW DOCUMENT NO.	DOCUMENT TITLE	
201238 C000	S00B01-ARW-CIV-DET-00061	Locality Plan	0
201238 C101	S00B01-ARW-CIV-SUR-00020	Survey Sheet 1 of 7	0
201238 C102	S00B01-ARW-CIV-SUR-00021	Survey Sheet 2 of 7	0
201238 C103	S00B01-ARW-CIV-SUR-00022	Survey Sheet 3 of 7	0
201238 C104	S00B01-ARW-CIV-SUR-00023	Survey Sheet 4 of 7	0
201238 C105	S00B01-ARW-CIV-SUR-00024	Survey Sheet 5 of 7	0
201238 C106	S00B01-ARW-CIV-SUR-00025	Survey Sheet 6 of 7	0
201238 C107	S00B01-ARW-CIV-SUR-00026	Survey Sheet 7 of 7	0
201238 C110	S00B01-ARW-CIV-LAY-00058	Layout Sheet 1 of 7	0
201238 C111	S00B01-ARW-CIV-LAY-00059	Layout Sheet 2 of 7	0
201238 C112	S00B01-ARW-CIV-LAY-00060	Layout Sheet 3 of 7	0
201238 C113	S00B01-ARW-CIV-LAY-00061	Layout Sheet 4 of 7	0
201238 C114	S00B01-ARW-CIV-LAY-00062	Layout Sheet 5 of 7	0
201238 C115	S00B01-ARW-CIV-LAY-00063	Layout Sheet 6 of 7	0
201238 C116	S00B01-ARW-CIV-LAY-00064	Layout Sheet 7 of 7	0
201238 C117	S00B01-ARW-CIV-LAY-00065	Duleen-Daandine Road Intersection Layout	0
201238 C120	S00B01-ARW-CIV-DET-00062	Typical Sections and Details Sheet 1 of 2	0
201238 C121	S00B01-ARW-CIV-DET-00063	Typical Sections and Details Sheet 2 of 2	0
201238 C125	S00B01-ARW-CIV-DET-00064	Drainage Detail	0
201238 C130	S00B01-ARW-CIV-LSN-00036	Longitudinal Sections Sheet 1 of 8	0
201238 C131	S00B01-ARW-CIV-LSN-00037	Longitudinal Sections Sheet 2 of 8	0
201238 C132	S00B01-ARW-CIV-LSN-00038	Longitudinal Sections Sheet 3 of 8	0
201238 C133	S00B01-ARW-CIV-LSN-00039	Longitudinal Sections Sheet 4 of 8	0
201238 C134	S00B01-ARW-CIV-LSN-00040	Longitudinal Sections Sheet 5 of 8	0
201238 C135	S00B01-ARW-CIV-LSN-00041	Longitudinal Sections Sheet 6 of 8	0
201238 C136	S00B01-ARW-CIV-LSN-00042	Longitudinal Sections Sheet 7 of 8	0
201238 C137	S00B01-ARW-CIV-LSN-00043	Longitudinal Sections Sheet 8 of 8	0
201238 C140	S00B01-ARW-CIV-CRS-00045	Cross Sections Sheet 1 of 10	0
201238 C141	S00B01-ARW-CIV-CRS-00046	Cross Sections Sheet 2 of 10	0
201238 C142	S00B01-ARW-CIV-CRS-00047	Cross Sections Sheet 3 of 10	0
201238 C143	S00B01-ARW-CIV-CRS-00048	Cross Sections Sheet 4 of 10	0
201238 C144	S00B01-ARW-CIV-CRS-00049	Cross Sections Sheet 5 of 10	0
201238 C145	S00B01-ARW-CIV-CRS-00050	Cross Sections Sheet 6 of 10	0
201238 C146	S00B01-ARW-CIV-CRS-00051	Cross Sections Sheet 7 of 10	0
201238 C147	S00B01-ARW-CIV-CRS-00052	Cross Sections Sheet 8 of 10	0
201238 C148	S00B01-ARW-CIV-CRS-00053	Cross Sections Sheet 9 of 10	0
201238 C149	S00B01-ARW-CIV-CRS-00054	Cross Sections Sheet 10 of 10	0
201238 C160	S00B01-ARW-CIV-LAY-00066	Vehicle Swept Paths Layout Sheet 1 of 2	0
201238 C161	S00B01-ARW-CIV-LAY-00067	Vehicle Swept Paths Layout Sheet 2 of 2	0
201238 C170	S00B01-ARW-CIV-DET-00065	Control Line Setout Details	0
201238 C180	S00B01-ARW-CIV-DET-00066	Erosion and Sediment Control Details	0
	S00B01-ARW-CIV-REP-00034	Pavement Design Report	
	S00B01-ARW-CIV-REP-00035	Safety in Design Report	
	S00B01-ARW-CIV-REP-00036	Design Exception Report	
	S00B01-ARW-CIV-BUD-00007	Construction Cost Estimate	
	S00B01-ARW-CIV-MTO-00011	Bill of Quantities	
	S00B01-ARW-CIV-SPR-00007	Specification	

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B&A REFERENCE No.	ARROW DOCUMENT No.	DOCUMENT TITLE	
201237 C000	S00B01-ARW-CIV-DET-00056	Locality Plan	0
201237 C101	S00B01-ARW-CIV-SUR-00014	Survey Sheet 1 of 6	0
201237 C102	S00B01-ARW-CIV-SUR-00015	Survey Sheet 2 of 6	0
201237 C103	S00B01-ARW-CIV-SUR-00016	Survey Sheet 3 of 6	0
201237 C104	S00B01-ARW-CIV-SUR-00017	Survey Sheet 4 of 6	0
201237 C105	S00B01-ARW-CIV-SUR-00018	Survey Sheet 5 of 6	0
201237 C106	S00B01-ARW-CIV-SUR-00019	Survey Sheet 6 of 6	0
201237 C110	S00B01-ARW-CIV-LAY-00049	Layout Sheet 1 of 6	0
201237 C111	S00B01-ARW-CIV-LAY-00050	Layout Sheet 2 of 6	0
201237 C112	S00B01-ARW-CIV-LAY-00051	Layout Sheet 3 of 6	0
201237 C113	S00B01-ARW-CIV-LAY-00052	Layout Sheet 4 of 6	0
201237 C114	S00B01-ARW-CIV-LAY-00053	Layout Sheet 5 of 6	0
201237 C115	S00B01-ARW-CIV-LAY-00054	Layout Sheet 6 of 6	0
201237 C116	S00B01-ARW-CIV-LAY-00055	Theten Road Intersection Layout	0
201237 C120	S00B01-ARW-CIV-DET-00057	Typical Cross Sections and Details	0
201237 C121	S00B01-ARW-CIV-DET-00058	Drainage Details	0
201237 C130	S00B01-ARW-CIV-LSN-00029	Longitudinal Section Control Line RS01 Sheet 1 of 7	0
201237 C131	S00B01-ARW-CIV-LSN-00030	Longitudinal Section Control Line RS01 Sheet 2 of 7	0
201237 C132	S00B01-ARW-CIV-LSN-00031	Longitudinal Section Control Line RS01 Sheet 3 of 7	0
201237 C133	S00B01-ARW-CIV-LSN-00032	Longitudinal Section Control Line RS01 Sheet 4 of 7	0
201237 C134	S00B01-ARW-CIV-LSN-00033	Longitudinal Section Control Line RS01 Sheet 5 of 7	0
201237 C135	S00B01-ARW-CIV-LSN-00034	Longitudinal Section Control Line RS01 Sheet 6 of 7	0
201237 C136	S00B01-ARW-CIV-LSN-00035	Longitudinal Section Control Line RS01 Sheet 7 of 7	0
201237 C140	S00B01-ARW-CIV-CRS-00034	Cross Sections Control Line RS01 Sheet 1 of 11	0
201237 C141	S00B01-ARW-CIV-CRS-00035	Cross Sections Control Line RS01 Sheet 2 of 11	0
201237 C142	S00B01-ARW-CIV-CRS-00036	Cross Sections Control Line RS01 Sheet 3 of 11	0
201237 C143	S00B01-ARW-CIV-CRS-00037	Cross Sections Control Line RS01 Sheet 4 of 11	0
201237 C144	S00B01-ARW-CIV-CRS-00038	Cross Sections Control Line RS01 Sheet 5 of 11	0
201237 C145	S00B01-ARW-CIV-CRS-00039	Cross Sections Control Line RS01 Sheet 6 of 11	0
201237 C146	S00B01-ARW-CIV-CRS-00040	Cross Sections Control Line RS01 Sheet 7 of 11	0
201237 C147	S00B01-ARW-CIV-CRS-00041	Cross Sections Control Line RS01 Sheet 8 of 11	0
201237 C148	S00B01-ARW-CIV-CRS-00042	Cross Sections Control Line RS01 Sheet 9 of 11	0
201237 C149	S00B01-ARW-CIV-CRS-00043	Cross Sections Control Line RS01 Sheet 10 of 11	0
201237 C150	S00B01-ARW-CIV-CRS-00044	Cross Sections Control Line RS01 Sheet 11 of 11	0
201237 C160	S00B01-ARW-CIV-LAY-00056	Vehicle Swept Paths Sheet 1 of 2	0
201237 C161	S00B01-ARW-CIV-LAY-00057	Vehicle Swept Paths Sheet 2 of 2	0
201237 C170	S00B01-ARW-CIV-DET-00059	Control Line Setout Details	0
201237 C180	S00B01-ARW-CIV-DET-00060	Erosion and Sediment Control Details	0
	S00B01-ARW-CIV-REP-00004	Pavement Design Report	
	S00B01-ARW-CIV-REP-00021	Safety In Design Report	
	S00B01-ARW-CIV-REP-00022	Design Exception Report	
	S00B01-ARW-CIV-BUD-00006	Estimate of Construction Cost	
	S00B01-ARW-CIV-MTO-00010	BOQ	
	S00B01-ARW-CIV-SPR-00006	Specifications	
	S00B01-ARW-CIV-REP-00029	Gap Analysis Report	

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The department advises that it has decided to approve the application, subject to the following conditions:

No.	Conditions of Approval	Condition Timing
Road Works		
A. General		
1	a. Road Works comprising upgrading sections 1 and 3 of the Daandine Nandi Road shall be undertaken in accordance with the above issued for construction plans. b. Up stream and down stream flood immunity post upgrading works is required to be maintained to pre upgrading flood immunity levels and to maintain no worsening storm water impacts. Spot survey levels pre and post developed works shall be provided to confirm that finish levels remain the same. c. Consultation on the impacts of the proposed works shall be undertaken to ensure the local community and elected representatives are aware of changed traffic conditions on both a permanent and temporary basis. This includes stakeholder engagement with respect to consulting on direct property accesses impacted by the proposed upgrading works on both a temporary and permanent nature. Community engagement is to commence a minimum of one (1) month prior to Daandine Nandi Road upgrading works commencing Community engagement is also required to be undertaken during any temporary changes to ensure safe and efficient movement of traffic through the effected area. Community engagement/information depending on the scope of works and impact on the public shall be undertaken generally in accordance with “Community Engagement Developer Works” document (attached) All proposed communication material and any reference to TMR on any publicity release is required to be sent to Department of Transport and Main Roads for review before distribution. TMR will review and approve material prior to distribution. Developer is required to provide evidence outlining all community consultation undertaken. As these upgrading works are third party works, All costs and community engagement are at the developers (arrow) expense and responsibility.	Construction of road works must not commence until the prestart meeting has concluded and an 'Authority to Commence Works' has been issued.

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No.	Conditions of Approval	Condition Timing
	d. Developers responsibility to locate and protect existing high pressure gas main located within the works extents area both during and post construction of road works. Protection measures and gas main details shall be RPEQ certified and marked on as constructed drawings	
2	All road works are to be carried out in accordance with TMR's specifications and standards.	Prior to commencement of use.
3	This conditional approval is valid for one year from the date of this letter.	'At all times.
4	The Road Works are to be constructed at no cost to TMR.	At all times.
5	TMR officers are to be allowed access to the project site for the purpose of ensuring compliance with TMR's conditions.	At all times during construction.
6	Any damage to the existing road infrastructure caused by carrying out the Road Works is to be rectified/repaired at no cost to TMR.	Prior to TMR issuing 'Certificate of Completion'.
7	A security in accordance with the attached factsheet titled, Bonds or Security Deposits required by a Road Works Approval (under section 33 of the Transport Infrastructure Act 1991) is to be lodged with the TMR office in Toowoomba. The security is to be provided as two documents – one for 50% of the security amount and the other for 50% of the security amount. The bond provided must be any of the following: • Cash; • An unconditional, irrevocable bank guarantee using TMR form F5086 (attached) for a bank approved by TMR; or • An unconditional, irrevocable insurance bond using TMR form F5087 (attached) from an insurance company approved by TMR. Recourse to bond – TMR may convert into money at any time such part of the Security provided that does not consist of money. TMR will not be liable in any way for any loss occasioned by the conversion of any part of the Security into money.	Prior to Prestart Meeting.
B. Documents for Approval		
8	All TMR Technical Specifications are to be read in conjunction with 'MRTS01 Introduction to Technical Specifications' (including annexure).	At all times.
9	An Erosion and Sediment Control Plan (ERSCP) in accordance	Prior to Prestart Meeting.

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No.	Conditions of Approval	Condition Timing
	with TMR's specification 'MRTS52 Environment Management' is to be submitted to TMR for approval.	
10	A Traffic Management Plan (TMP) in accordance with TMR specification 'MRTS02 Provisions for Traffic' (including annexures), TMR's 'Road Planning and Design Manual' and 'Manual of Uniform Traffic Control Devices – Part 3, Works on Roads' is to be submitted to TMR for approval. The TMP must include, but is not limited to the following details: a) Work site access / Site Plan b) Traffic Guidance Scheme c) Storing or plant and materials	Prior to Prestart Meeting.
11	A Construction Management Plan (CMP) in accordance with TMR's 'Road Planning and Design Manual' is to be submitted to TMR for approval.	Prior to Prestart Meeting.
12	An Environment Management Plan (EMP) in accordance with TMR specification 'MRTS51 Environment Management' is to be submitted to TMR for approval.	Prior to Prestart Meeting.
13	A Quality Management Plan (QMP) in accordance with TMR specification 'MRTS50 Specific Quality System Requirements' must be submitted to TMR for approval. The QMP must include, but is not limited to the following details: a) All Hold Points, Witness Points and Milestones b) Testing frequencies, lot sizes and numbers c) Name and address of laboratory, accredited by the National Association of Testing Authorities (NATA), carrying out samplings Note: at least 24 hours notice is to be given to TMR advising of required inspections.	Prior to Prestart Meeting.
C. Principal Contractor		
14	A completed 'Principal Contractors Details and Bond Estimate' form F5084 (attached) is to be completed and returned to TMR. The nominated principal contractor must have sufficient expertise to carry out the proposed road works and hold a current public liability insurance policy that notes TMR's interest in the amount of not less than $20 million.	Prior to TMR issuing an 'Authority for Prestart Meeting'.
15	A completed 'Deed of Indemnity' for the Road Works (completed by the Principal Contractor) using TMR form F5109 (attached) is to be submitted to TMR.	Prior to TMR issuing an 'Authority for Prestart Meeting'.

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No.	Conditions of Approval	Condition Timing
D. Prestart Meeting		
16	A Prestart meeting attended by the applicant's representative and/or the principal contractor and TMR's representative is to be held. The prestart meeting will include, but is not limited to the following: a) Introduction of stakeholders. b) Review of road works approved drawings and management plans. c) Construction activities and program. d) Issues pertaining to a Zero Harm working environment. It is intended an 'Authority to Commence Works' will be issued at the Prestart meeting. To arrange a Prestart meeting, please contact Chris Green at Christopher.R.Green@tmr.qld.gov.au	A minimum of five business days prior to the commencement of the road works.
E. Practical Completion		
17	A 'Certificate of Practical Completion' of the Road Works by a Registered Professional Engineer of Queensland (RPEQ) is to be submitted. The 'Certificate of Practical Completion' must include, but is not limited to the following details: a) Testing and inspection plans b) Documentation of dimensional check c) 'As constructed' plans.	Within five (5) days of the completion of the work.
F. Maintenance Period		
18	Any defect which develops in work within the limits of TMR's maintenance responsibility during the on-maintenance period must be rectified by the applicant at no cost to TMR. The defect liability period is eighteen months commencing from the date the letter of certificate of practical completion is received by this office.	Until TMR has formally accepted off-maintenance the portion of the works, if any, for which it will accept responsibility for future maintenance.

Important information for applicants

This approval does not authorise you to commence road works. Prior to any road works being undertaken within the boundary of the state-controlled road, the department must have issued you with an authority to commence works. The authority to commence works will not be issued until all the requirements of the above conditions have been fulfilled.

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If any variations from the approved road works are required, further written approval from the department must first be obtained.

You should also be aware that you may have other statutory obligations. This conditional approval is for the TIA only.

This document must be retained as evidence of the road works approval.

If you would like to discuss this application, please contact Jeffrey Lavey, on (07) 4639 0828.

Yours sincerely

NR

Jason McGuire
Senior Town Planner

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Queensland Government

Deed of Indemnity for construction of road works on a State-controlled road

(section 33 of the *Transport Infrastructure Act 1994*)

Department of Transport and Main Roads reference number

TMR

Contractor (insert name of contractor carrying out works, as shown on public liability insurance)

Road works (insert description of works and location)

I/We the contractor named above:

a. indemnify the State of Queensland (represented by the department), its officers, employees and agents (the **Indemnified**) against any or all Losses suffered or incurred (except to the extent that any Losses are caused through the negligent act or omission of the Indemnified) in connection with the construction of the **road works**

b. acknowledge that provision of this indemnity is a condition of approval of the **road works** under section 33 of the *Transport Infrastructure Act*.

In this deed, '**Losses**' include liabilities, losses, damages, expenses and costs (including, legal costs on a full indemnity basis and whether incurred or awarded) of any kind or nature whether arising in contract or tort (including, but not limited to negligence) or under a statute, and also includes:

a. loss of profits, loss of revenue, loss of anticipated savings, loss of opportunity, pure economic loss and loss of data

b. any other consequential, special or indirect loss or damage.

Executed as a deed

For company:
Signed, sealed and delivered

on the _____ day of _____ 20 ____ in accordance with section 127 of the *Corporations Act 2001* (Cth).

_____
Signature of director

_____
Full name of director

_____
Signature of company secretary/director

_____
Full name of company secretary/director

For individual:
Signed, sealed and delivered by

_____

on the _____ day of _____ 20 ____ in the presence of:

_____
Signature of witness

_____
Full name of witness

_____
Signature

TRB Forms Area Form F5109 CFD V01 May 2016

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Bonds or Security Deposits required by a Road Works Approval (under section 33 of the *Transport Infrastructure Act* 1994)

All road works within the state-controlled road corridor must be constructed in accordance with the Department of Transport and Main Roads' (TMR) standards and specifications for road works. To ensure that the required works are constructed to TMR's standards, a bond or security deposit may be required as a condition of road works approval.

Approval to construct road works

The conditional road works approval does not authorise road works to commence.

If a bond is required it will be included as a condition of the road works approval. Works may only commence when **ALL** conditions of the conditional approval have been fulfilled and TMR has issued an 'Authority to Commence Works'.

What you need to provide

If the conditional road works approval requires a bond to be provided to TMR, the bond can be lodged with the department in a number of formats including;

- cash or bank cheque;
- bank guarantee; or
- insurance bond.

TMR has approved form templates for bank guarantees and insurance bonds. The templates can be found on the website at: http://www.tmr.qld.gov.au/Community-and-environment/Planning-and-development/Other-matters-requiring-approval.aspx.

The use of alternate forms is generally not acceptable.

Amount of security

The amount of security will be based on the total estimated cost of the works within the state-controlled road. The applicant will be required to provide TMR with an estimate of the total costs of the works, including all materials, traffic management, service relocations, labour and plant hire.

The amount of bond is determined by the level of risk TMR is exposed to while the works are being undertaken and provide incentive for the works to be finalised without delay or outstanding issues.

The table is a guide in determining the amount of bond required, however for specific advice, please contact the relevant TMR office for assistance.

Bond as % of the cost of the construction of the conditioned works	Works completed in accordance with the timing conditioned	Works where TMR accepts a relaxation in the conditioned timing
Prequalified Constructor	25%	100%
Accepted Non-Prequalified Constructor	65%	125%
Other Constructor	115%	200%

The advantages of using a prequalified constructor include:

- knowledge and experience of TMR standards and procedures;
- financial stability; and
- experience in undertaking works on a state-controlled road.

Information about becoming a Prequalified Constructor is available by contacting: contractorprequal@tmr.qld.gov.au

Evidence of Construction of the Road Works and return of security

TMR will need you to provide evidence that the road works have been constructed in accordance with TMR standards and specifications. This may include the provision of "as constructed" drawings and quality documentation (i.e. pavement testing, electrical certification.

TMR will return a bond or other agreed security once the conditions under which the bond is held are fulfilled. The return of any bond will be assessed on a case by case basis. Applicants are encouraged to work with TMR officers to ensure that all requirements are complied with in full.

Important Notes:

1. It is important to read and understand all approvals given to you by TMR as you must comply with them.
2. If you do not understand something or have any additional questions, contact the TMR office that issued the approval.

V2.0 - December 2019

Queensland Government

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Queensland Government

Principal Contractor's Details and Bond Estimate

Application details

Department of Transport and Main Roads reference number

TMR

Pursuant to the conditional approval of the subject application, I nominate the following as the principal contractor for the works. I request that you deal with the principal contractor for all matters relating to the construction works.

Applicant's name

Applicant's signature

Date / /

Principal contractor's details

Legal name

Australian Business Number (ABN)

Registered address

Postcode

Physical address

Postcode

Telephone number (work hours)

Telephone number (after hours)

Mobile number

Email address

Primary contact person (overseer)

Position

Telephone number (work hours)

Telephone number (after hours)

Mobile number

Prequalification status (please check one)

Department of Transport and Main Roads prequalified ☐ Prequalified number

Not Department of Transport and Main Roads prequalified ☐ Attach evidence of:

i. previous construction works (preferably on a State-controlled road)
ii. ability to carry out the works in accordance with the approved plans, standards and specifications
iii. qualifications and experience of the primary contact person (overseer), including the Registered Professional Engineer of Queensland number.

Principal contractor's insurance and indemnity (please check if attached)

☐ Attached is the *Deed of Indemnity for road works on a State-controlled road* (form F5109) signed by the principal contractor.

☐ Attached is evidence of the principal contractor's public liability insurance policy of no less than $20 million that notes the Department of Transport and Main Roads interest on the policy.

Construction works costs

Estimated cost of the works $

Bond amount $

☐ Attached are details supporting the estimation of costs of works (for example, bill of quantities).

Privacy statement: The Department of Transport and Main Roads is collecting the information on this form for the purpose of managing the road works (under s33 of *the Transport Infrastructure Act 1994*) that are being undertaken by a third party with respect to an application for such works. The details will not be disclosed to any other third party without your consent unless required by law.

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Unconditional Insurance Bond for Security

Department of Transport and Main Roads reference number

Security number (Office use only)

This deed ('this undertaking') is made on the:

Between:

The State of Queensland acting through the Department of Transport and Main Roads

referred to as 'the Principal'

And: **Australian Company Number (ACN)**

referred to as 'the Insurance Company' (include return address for security)

In relation to: **(ACN)**

referred to as 'the Constructor'

Recitals

a. Pursuant to section 33 of the *Transport Infrastructure Act 1994*, the Principal has approved the Constructor to undertake works ('the Approval') described as follows:

Approval reference **Date of approval**

referred to as 'the Approval'

to carry out the following work:

referred to as 'the Works'

b. The Constructor has requested that the Principal accept this Undertaking as the Security required by the Approval.

Privacy statement - The Department of Transport and Main Roads collects personal information on this form so that you may execute the deed. The information on this form is accessible by authorised departmental officers and external personnel who are engaged to administer the Contract who will not disclose your personal details to a third party without your consent unless required to do so by law.

continued page 2...

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Department of Transport and Main Roads reference number

This Deed witnesses–

1. At the request of the Constructor and in consideration of the Principal accepting this Undertaking as the Security required by the Approval, the Insurance Company unconditionally and irrevocably undertakes to pay on demand in writing and this Undertaking is produced for sighting to the Bank, any sum or sums which may from time to time be demanded by the Principal to a maximum aggregate sum ('the Maximum Sum') of–

   Maximum Sum in figures: $ _____ Maximum Sum in words: _____

2. The Insurance Company's liability under this Undertaking is a continuing liability and is to continue until notification has been received from the Principal that the Maximum Sum is no longer required by the Principal or until this Undertaking is returned to the Insurance Company or until payment to the Principal by the Insurance Company of the whole of the Maximum Sum. The Principal must return this Undertaking to the Insurance Company when the Insurance Company's liability under this Undertaking has been completely discharged.
3. Should the Insurance Company be notified in writing, purporting to be signed by or on behalf of the Principal, that the Principal desires payment to be made of the whole or any part or parts of the Maximum Sum and this Undertaking is produced for sighting to the Insurance Company it is unconditionally and irrevocably agreed that the Insurance Company will make the payment or payments to the Principal immediately and without reference to the Constructor or to any other person and notwithstanding any notice given by the Constructor not to pay same. The authority of the person signing the demand need not be proved.
4. The Insurance Company's liability under this Undertaking may be terminated at any time upon payment to the Principal (without the Insurance Company being required to do so) of the Maximum Sum, less any amount or amounts the Insurance Company may previously have paid under this Undertaking, or such lesser sum as may be specified by the Principal, and thereupon the liability of the Insurance Company hereunder shall immediately cease and determine.
5. This Undertaking and the Insurance Company's liability under it–
   a. is not contingent upon, or discharged or impaired by reason of, any other right or obligation appearing in or arising under any other document
   b. shall not be discharged or impaired by reason of any variation (with or without the knowledge or consent of the Insurance Company) to any of the provisions of the Approval, the work under the Approval, the Works or any acts or things to be executed, performed or done under the Approval, or by reason of any breach or breaches of the Approval by the Constructor or the Principal.
6. The benefit of this Undertaking is not assignable by the Principal.
7. This Undertaking shall be governed by the laws of the State of Queensland.

Dated at: Place _____ this Day _____ day of Month _____ Year _____

Executed as a Deed on the date first appearing above.

Signed, sealed and delivered for and on behalf of

Name and branch of Insurance Company _____ (ACN) _____ Company Seal (where applicable) _____

by its duly authorised attorney

Attorney's name _____ Date executed / /

Attorney's position _____ Attorney's signature _____

pursuant to a power of attorney dated

Date of power of attorney / / and the attorney hereby declares that he/she has not received notice of revocation of the power of attorney

in the presence of

Witness' name _____ Witness' signature _____

Date witnessed / /

See page 1 for privacy statement.

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Queensland Government

Unconditional Bank Guarantee for Security

Department of Transport and Main Roads reference number

Security number (Office use only)

This deed ('this undertaking') is made on the:

Between:

The State of Queensland acting through the Department of Transport and Main Roads

referred to as 'the Principal'

And:

Australian Company Number (ACN)

referred to as 'the Bank' (include address for Return of Security)

In relation to:

ACN

referred to as 'the Constructor'

Recitals

a. Pursuant to section 33 of the *Transport Infrastructure Act 1994*, the Principal has approved the Constructor to undertake works ('the Approval') described as follows:

Approval reference

Date of approval

referred to as 'the Approval'

to carry out the following work:

referred to as 'the Works'

b. The Constructor has requested that the Principal accept this Undertaking as the Security required by the Approval.

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Privacy statement - The department collects personal information on this form so that you may execute the deed. The information on this form is accessible by authorised departmental officers and external personnel who are engaged to administer the Contract who will not disclose your personal details to a third party without your consent unless required to do so by law.

continued page 2...

Unconditional Bank Guarantee for Security ... continued page 2 of 2

Departmental reference number

This Deed witnesses–

1. At the request of the Constructor and in consideration of the Principal accepting this Undertaking as the Security required by the Approval, the Bank unconditionally and irrevocably undertakes to pay on demand in writing and this Undertaking is produced for sighting to the Bank, any sum or sums which may from time to time be demanded by the Principal to a maximum aggregate sum ('the Maximum Sum') of–

   Maximum Sum in figures: $ _____ Maximum Sum in words: _____

2. The Bank's liability under this Undertaking is a continuing liability and is to continue until notification has been received from the Principal that the Maximum Sum is no longer required by the Principal or until this Undertaking is returned to the Bank or until payment to the Principal by the Bank of the whole of the Maximum Sum. The Principal must return this Undertaking to the Bank when the Bank's liability under this Undertaking has been completely discharged.
3. Should the Bank be notified in writing, purporting to be signed by or on behalf of the Principal, that the Principal desires payment to be made of the whole or any part or parts of the Maximum Sum, and this Undertaking is produced for sighting to the Bank, it is unconditionally and irrevocably agreed that the Bank will make the payment or payments to the Principal immediately and without reference to the Constructor or to any other person and notwithstanding any notice given by the Constructor not to pay same. The authority of the person signing the demand need not be proved.
4. The Bank's liability under this Undertaking may be terminated at any time upon payment to the Principal (without the Bank being required to do so) of the Maximum Sum, less any amount or amounts the Bank may previously have paid under this Undertaking, or such lesser sum as may be specified by the Principal, and thereupon the liability of the Bank hereunder shall immediately cease and determine.
5. This Undertaking and the Bank's liability under it–
   a. is not contingent upon, or discharged or impaired by reason of, any other right or obligation appearing in or arising under any other document
   b. shall not be discharged or impaired by reason of any variation (with or without the knowledge or consent of the Bank) to any of the provisions of the Contract, the work under the Contract, the Works or any acts or things to be executed, performed or done under the Contract, or by reason of any breach or breaches of the Contract by the Constructor or the Principal.
6. The benefit of this Undertaking is not assignable by the Principal.
7. This Undertaking shall be governed by the laws of the State of Queensland.

Dated at: Place _____ this Day _____ day of Month _____ Year _____

Executed as a Deed on the date first appearing above

Signed, sealed and delivered for and on behalf of

Name and branch of Bank _____ ACN _____ Company Seal (where applicable) _____

by its duly authorised attorney

Attorney's name _____ Date executed / /

Attorney's position _____ Attorney's signature _____

pursuant to a power of attorney dated

Date of power of attorney / / and the attorney hereby declares that he/she has not received notice of revocation of the power of attorney

in the presence of

Witness' name _____ Witness' signature _____

Date witnessed / /

See page 1 for privacy statement.

Released under RTI - DTMR

UNCONDITIONAL INSURANCE BOND for SECURITY

NR



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NR



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LOCALITY PLAN
NOT TO SCALE

DRAWING LIST			
DWG.NO.	ARROW DOC. No.	DESCRIPTION	ISSUE
201237 C000	S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	3
201237 C101	S00B01-ARW-CIV-SUR-00014	SURVEY SHEET 1 OF 6	0
201237 C102	S00B01-ARW-CIV-SUR-00015	SURVEY SHEET 2 OF 6	0
201237 C103	S00B01-ARW-CIV-SUR-00016	SURVEY SHEET 3 OF 6	0
201237 C104	S00B01-ARW-CIV-SUR-00017	SURVEY SHEET 4 OF 6	0
201237 C105	S00B01-ARW-CIV-SUR-00018	SURVEY SHEET 5 OF 6	0
201237 C106	S00B01-ARW-CIV-SUR-00019	SURVEY SHEET 6 OF 6	0
201237 C110	S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	0
201237 C111	S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0
201237 C112	S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	1
201237 C113	S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6	0
201237 C114	S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	1
201237 C115	S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6	0
201237 C116	S00B01-ARW-CIV-LAY-00055	THETEN ROAD INTERSECTION LAYOUT	1
201237 C120	S00B01-ARW-CIV-DET-00057	TYPICAL SECTIONS AND DETAILS	3
201237 C121	S00B01-ARW-CIV-DET-00058	DRAINAGE DETAIL	2
201237 C130	S00B01-ARW-CIV-LSN-00029	LONGITUDINAL SECTIONS SHEET 1 OF 7	1
201237 C131	S00B01-ARW-CIV-LSN-00030	LONGITUDINAL SECTIONS SHEET 2 OF 7	2
201237 C132	S00B01-ARW-CIV-LSN-00031	LONGITUDINAL SECTIONS SHEET 3 OF 7	1
201237 C133	S00B01-ARW-CIV-LSN-00032	LONGITUDINAL SECTIONS SHEET 4 OF 7	0
201237 C134	S00B01-ARW-CIV-LSN-00033	LONGITUDINAL SECTIONS SHEET 5 OF 7	1
201237 C135	S00B01-ARW-CIV-LSN-00034	LONGITUDINAL SECTIONS SHEET 6 OF 7	1
201237 C136	S00B01-ARW-CIV-LSN-00035	LONGITUDINAL SECTIONS SHEET 7 OF 7	1
201237 C140	S00B01-ARW-CIV-CRS-00034	CROSS SECTIONS SHEET 1 OF 11	1
201237 C141	S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	1
201237 C142	S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11	2
201237 C143	S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11	1
201237 C144	S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11	0
201237 C145	S00B01-ARW-CIV-CRS-00039	CROSS SECTIONS SHEET 6 OF 11	0
201237 C146	S00B01-ARW-CIV-CRS-00040	CROSS SECTIONS SHEET 7 OF 11	0
201237 C147	S00B01-ARW-CIV-CRS-00041	CROSS SECTIONS SHEET 8 OF 11	1
201237 C148	S00B01-ARW-CIV-CRS-00042	CROSS SECTIONS SHEET 9 OF 11	1
201237 C149	S00B01-ARW-CIV-CRS-00043	CROSS SECTIONS SHEET 10 OF 11	1
201237 C150	S00B01-ARW-CIV-CRS-00044	CROSS SECTIONS SHEET 11 OF 11	1
201237 C160	S00B01-ARW-CIV-LAY-00056	VEHICLE SWEPT PATHS LAYOUT SHEET 1 OF 2	0
201237 C161	S00B01-ARW-CIV-LAY-00057	VEHICLE SWEPT PATHS LAYOUT SHEET 2 OF 2	0
201237 C170	S00B01-ARW-CIV-DET-00059	CONTROL LINE SETOUT DETAILS	0
201237 C180	S00B01-ARW-CIV-DET-00060	EROSION AND SEDIMENT CONTROL DETAILS	0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		3	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		2	11.03.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

NR

RPEQ CERTIFICATION
NR

STATUS
FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No.
201237 C000

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED
DRAWING No. S00B01-ARW-CIV-DET-00056

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LOCALITY PLAN

SCALE N.T.S. | REV 3 | A1



LOCALITY PLAN
NOT TO SCALE

DRAWING LIST			
DWG.NO.	ARROW DOC. No.	DESCRIPTION	ISSUE
201237 C000	S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	0
201237 C101	S00B01-ARW-CIV-SUR-00014	SURVEY SHEET 1 OF 6	0
201237 C102	S00B01-ARW-CIV-SUR-00015	SURVEY SHEET 2 OF 6	0
201237 C103	S00B01-ARW-CIV-SUR-00016	SURVEY SHEET 3 OF 6	0
201237 C104	S00B01-ARW-CIV-SUR-00017	SURVEY SHEET 4 OF 6	0
201237 C105	S00B01-ARW-CIV-SUR-00018	SURVEY SHEET 5 OF 6	0
201237 C106	S00B01-ARW-CIV-SUR-00019	SURVEY SHEET 6 OF 6	0
201237 C110	S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	0
201237 C111	S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0
201237 C112	S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	0
201237 C113	S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6	0
201237 C114	S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	0
201237 C115	S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6	0
201237 C116	S00B01-ARW-CIV-LAY-00055	THETEN ROAD INTERSECTION LAYOUT	0
201237 C120	S00B01-ARW-CIV-DET-00057	TYPICAL SECTIONS AND DETAILS	0
201237 C121	S00B01-ARW-CIV-DET-00058	DRAINAGE DETAIL	0
201237 C130	S00B01-ARW-CIV-LSN-00029	LONGITUDINAL SECTIONS SHEET 1 OF 7	0
201237 C131	S00B01-ARW-CIV-LSN-00030	LONGITUDINAL SECTIONS SHEET 2 OF 7	0
201237 C132	S00B01-ARW-CIV-LSN-00031	LONGITUDINAL SECTIONS SHEET 3 OF 7	0
201237 C133	S00B01-ARW-CIV-LSN-00032	LONGITUDINAL SECTIONS SHEET 4 OF 7	0
201237 C134	S00B01-ARW-CIV-LSN-00033	LONGITUDINAL SECTIONS SHEET 5 OF 7	0
201237 C135	S00B01-ARW-CIV-LSN-00034	LONGITUDINAL SECTIONS SHEET 6 OF 7	0
201237 C136	S00B01-ARW-CIV-LSN-00035	LONGITUDINAL SECTIONS SHEET 7 OF 7	0
201237 C140	S00B01-ARW-CIV-CRS-00034	CROSS SECTIONS SHEET 1 OF 11	0
201237 C141	S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	0
201237 C142	S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11	0
201237 C143	S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11	0
201237 C144	S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11	0
201237 C145	S00B01-ARW-CIV-CRS-00039	CROSS SECTIONS SHEET 6 OF 11	0
201237 C146	S00B01-ARW-CIV-CRS-00040	CROSS SECTIONS SHEET 7 OF 11	0
201237 C147	S00B01-ARW-CIV-CRS-00041	CROSS SECTIONS SHEET 8 OF 11	0
201237 C148	S00B01-ARW-CIV-CRS-00042	CROSS SECTIONS SHEET 9 OF 11	0
201237 C149	S00B01-ARW-CIV-CRS-00043	CROSS SECTIONS SHEET 10 OF 11	0
201237 C150	S00B01-ARW-CIV-CRS-00044	CROSS SECTIONS SHEET 11 OF 11	0
201237 C160	S00B01-ARW-CIV-LAY-00056	VEHICLE SWEPT PATHS LAYOUT SHEET 1 OF 2	0
201237 C161	S00B01-ARW-CIV-LAY-00057	VEHICLE SWEPT PATHS LAYOUT SHEET 2 OF 2	0
201237 C170	S00B01-ARW-CIV-DET-00059	CONTROL LINE SETOUT DETAILS	0
201237 C180	S00B01-ARW-CIV-DET-00060	EROSION AND SEDIMENT CONTROL DETAILS	0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION
NR

STATUS: FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

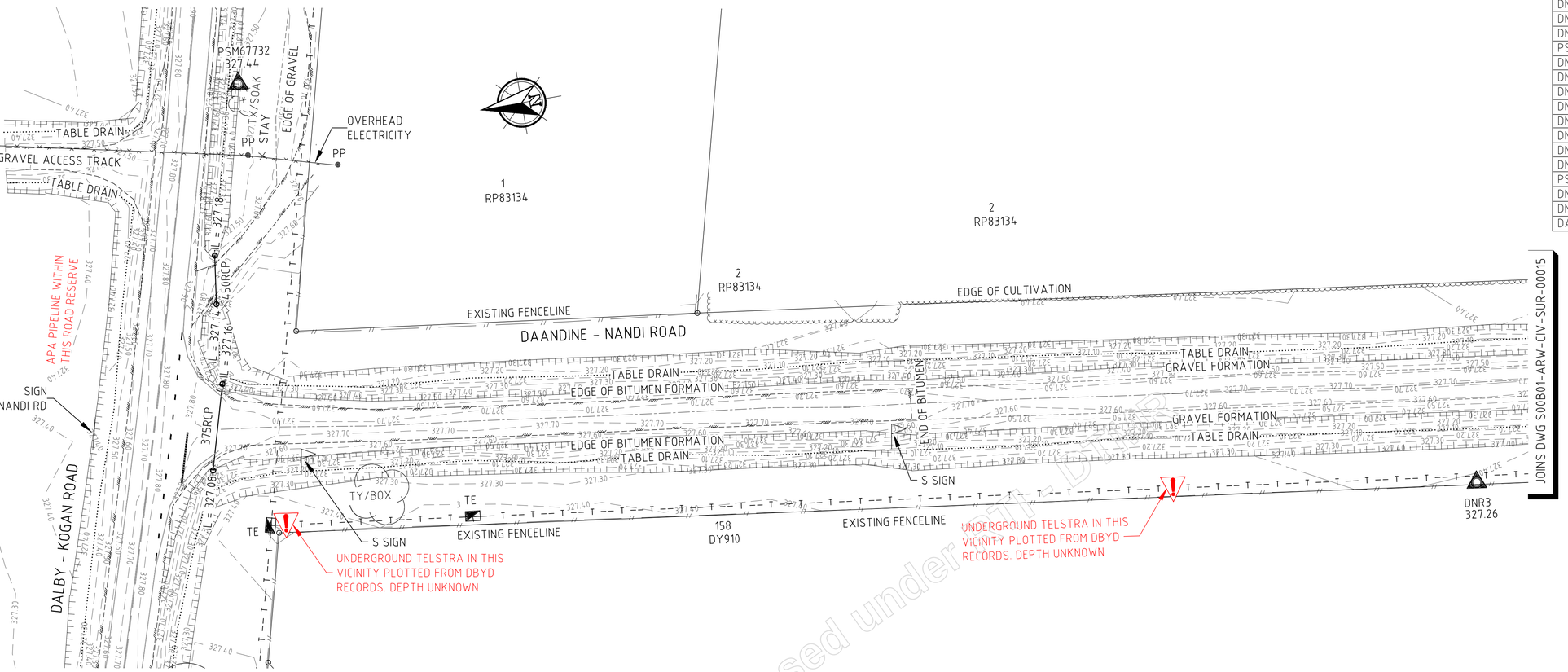
arrow energy go further

CONTRACTOR DWG No. 201237 C000

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LOCALITY PLAN

DRAWING No. S00B01-ARW-CIV-DET-00056
SCALE N.T.S.
REV 0
A1



BENCHMARK SITE CO - ORDINATES				
PT	EASTING	NORTHING	ELEVATION	CODE
DKR2	304481.751	7000565.077	327.25	DKR/2
DKR1	304936.712	7000429.689	327.612	DKR/1
DNR2	305981.249	6997528.738	329.205	DNR/2
PSM67732	304714.542	7000465.788	327.438	PSM/67732
PSM69220	313595.791	6997696.611	330.156	PSM69220
DNR3	304592.794	7000235.236	327.263	DNR/3
DNR4	304603.968	7000041.368	327.274	DNR/4
DNR5	304509.332	6999617.893	326.972	DNR/5
PSM63061	304508.955	6999537.333	326.698	PSM/63061
DNR6	304644.899	6999412.780	327.081	DNR/6
DNR7	304792.937	6999211.462	327.176	DNR/7
DNR8	304946.546	6999003.325	327.460	DNR/8
DNR9	305097.444	6998797.639	327.804	DNR/9
DNR10	305249.993	6998590.123	328.017	DNR/10
DNR11	305376.573	6998418.433	328.227	DNR/11
DNR12	305533.949	6998203.646	328.553	DNR/12
DNR13	305674.445	6998009.337	328.871	DNR/13
PSM181452	305755.308	6997901.262	329.042	PSM/181452
DNR14	305901.249	6997700.550	329.158	DNR/14
DNR15	306123.446	6997341.111	329.397	DNR/15
DAANDINE2	304547.900	6999904.194	326.992	BM/2

SURVEY INFORMATION

SURVEYOR: MURRAY & ASSOCIATES (QLD) PTY LTD

DATE OF SURVEY: 25 MAY 2020
ORIGIN: PSM 67732
EASTING: 304714.542
NORTHING: 7000465.788
LEVEL: RL 327.438m
LEVEL DATUM: AHD
HORIZONTAL DATUM: MGA94 (ZONE 56) AUSGEOID 09
LOCAL AUTHORITY: WESTERN DOWNS REGIONAL COUNCIL

THE CONTRACTOR SHOULD NOTE THAT ALL DESIGN SETOUT INFORMATION IS RELATIVE TO THE SURVEY. THE CONTRACTOR SHALL VERIFY THE SURVEY DATUM PRIOR TO COMMENCEMENT OF THE WORKS.

SURVEY NOTES:

1. POSITIONS OF SERVICES SHOWN ARE GIVEN FOR GUIDANCE ONLY.
2. UNDERGROUND SERVICES HAVE BEEN LOCATED FROM VISIBLE SURFACE FEATURES ONLY.
3. LOCATIONS AND/OR DEPTHS MAY NOT BE ACCURATELY REPRESENTED AND OTHER SERVICES MAY EXIST ON SITE.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE POSITION OF ALL SERVICES ON SITE PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE.
5. A DBYD ENQUIRY IS TO BE CONDUCTED AND THE RELEVANT AUTHORITY CONTACTED FOR POSSIBLE LOCATION OF ADDITIONAL UNDERGROUND SERVICES.
6. THE PROPERTY BOUNDARIES SHOWN HAVE NOT FULLY BEEN INVESTIGATED FOR THE PURPOSES OF THIS SURVEY. FOR AN ACCURATE DETERMINATION OF THE BOUNDARIES, AN IDENTIFICATION SURVEY WILL BE REQUIRED.
7. CONTRACTOR IS TO CONFIRM SURVEY INFORMATION WITH THE ORIGINAL SURVEYOR.

SURVEY LEGEND

SYMBOL	DESCRIPTION
300.1	EXISTING CONTOUR MINOR (0.1m INTERVAL)
300.5	EXISTING CONTOUR MAJOR (0.5m INTERVAL)
	EXISTING TOP OF BATTER
	EXISTING BOTTOM OF BATTER
//	EXISTING FENCE
	EXISTING GATE
	EXISTING EDGE OF BITUMEN
	EXISTING EDGE OF GRAVEL ROAD
T	EXISTING TELSTRA (PIT)
S	EXISTING SEWER LINE
W	EXISTING WATER LINE
UG	EXISTING UNDERGROUND ELECTRICITY
	EXISTING OVERHEAD POWERLINE
G	EXISTING GAS LINE
	EXISTING TREE LINE
SW	EXISTING STORMWATER
	EXISTING TREE
	SURVEY STATIONS (PSM, STATION, BENCHMARK)
	EXISTING TRAFFIC SIGN
	EXISTING CONTROL POINT
	EXISTING ELECT. LIGHT POLE
	EXISTING ELECTRICITY MANHOLE
	EXISTING POWER POLE
	EXISTING ELECTRICITY PILLAR
	EXISTING ELECTRICITY PIT
	EXISTING FIRE HYDRANT
	EXISTING STORMWATER GRATE
GAS	EXISTING GAS INFRASTRUCTURE
	EXISTING SEWER MANHOLE
	EXISTING SCOUR VALVE
	EXISTING STORMWATER MANHOLE
	EXISTING TELSTRA PIT
	EXISTING TELSTRA PILLAR
	EXISTING WATER METER
	EXISTING WATER VALVE

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-SUR-00015	SURVEY SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

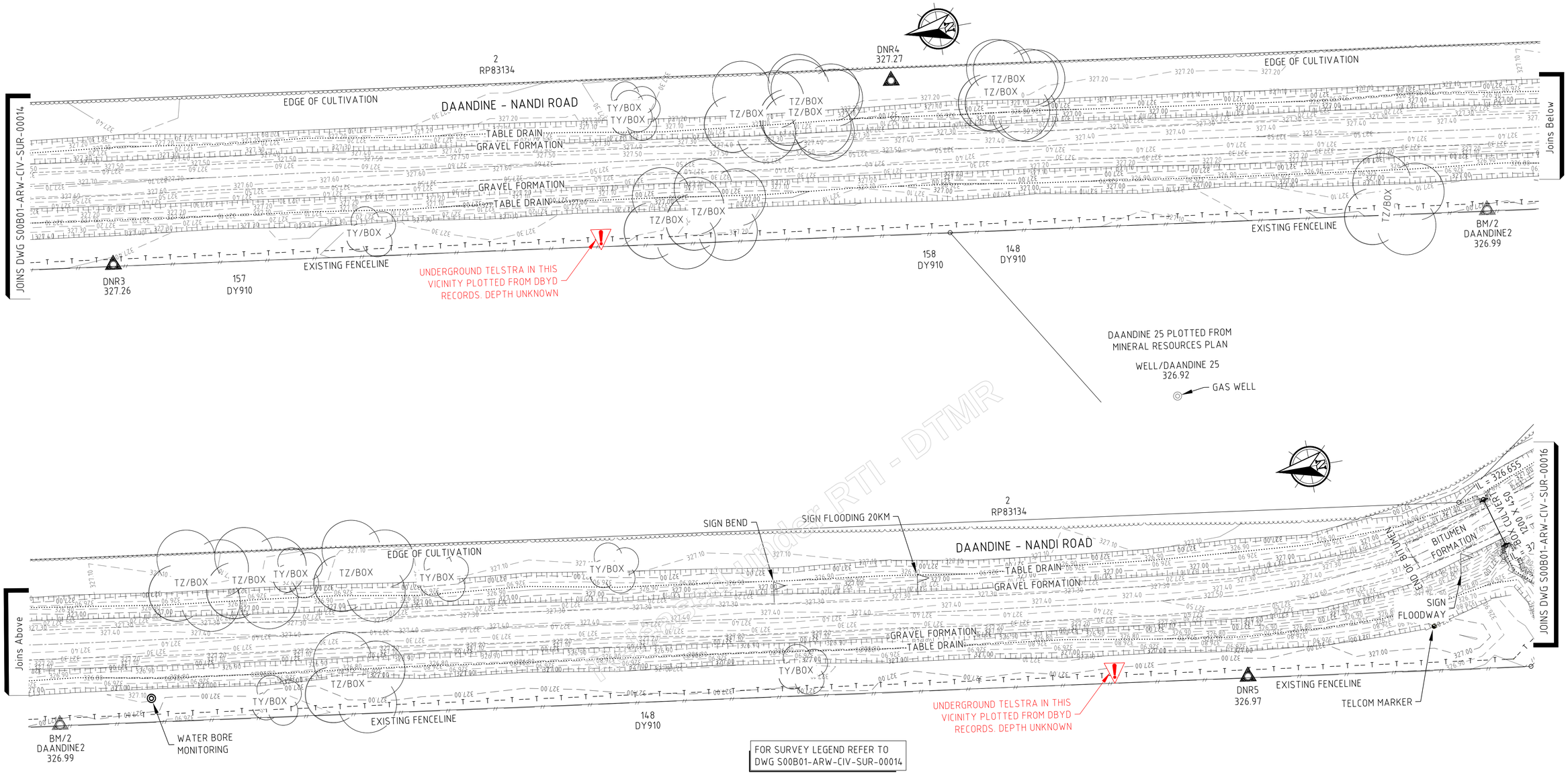
RPEQ CERTIFICATION
NR

brandon & associates ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

SITE	S00
PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED
STATUS	FOR CONSTRUCTION
CONTRACTOR DWG No.	201237 C101
DRAWING No.	S00B01-ARW-CIV-SUR-00014
SCALE	1:500m
REV	0
	A1

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 1 OF 6



10 0 10 20 30 40 50m

SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-SUR-00016	SURVEY SHEET 3 OF 6							
S00B01-ARW-CIV-SUR-00014	SURVEY SHEET 1 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS: FOR CONSTRUCTION

CONTRACTOR DWG No.: 201237 C102

SITE: S00

PLANT: B01

SECURITY CLASSIFICATION: RESTRICTED

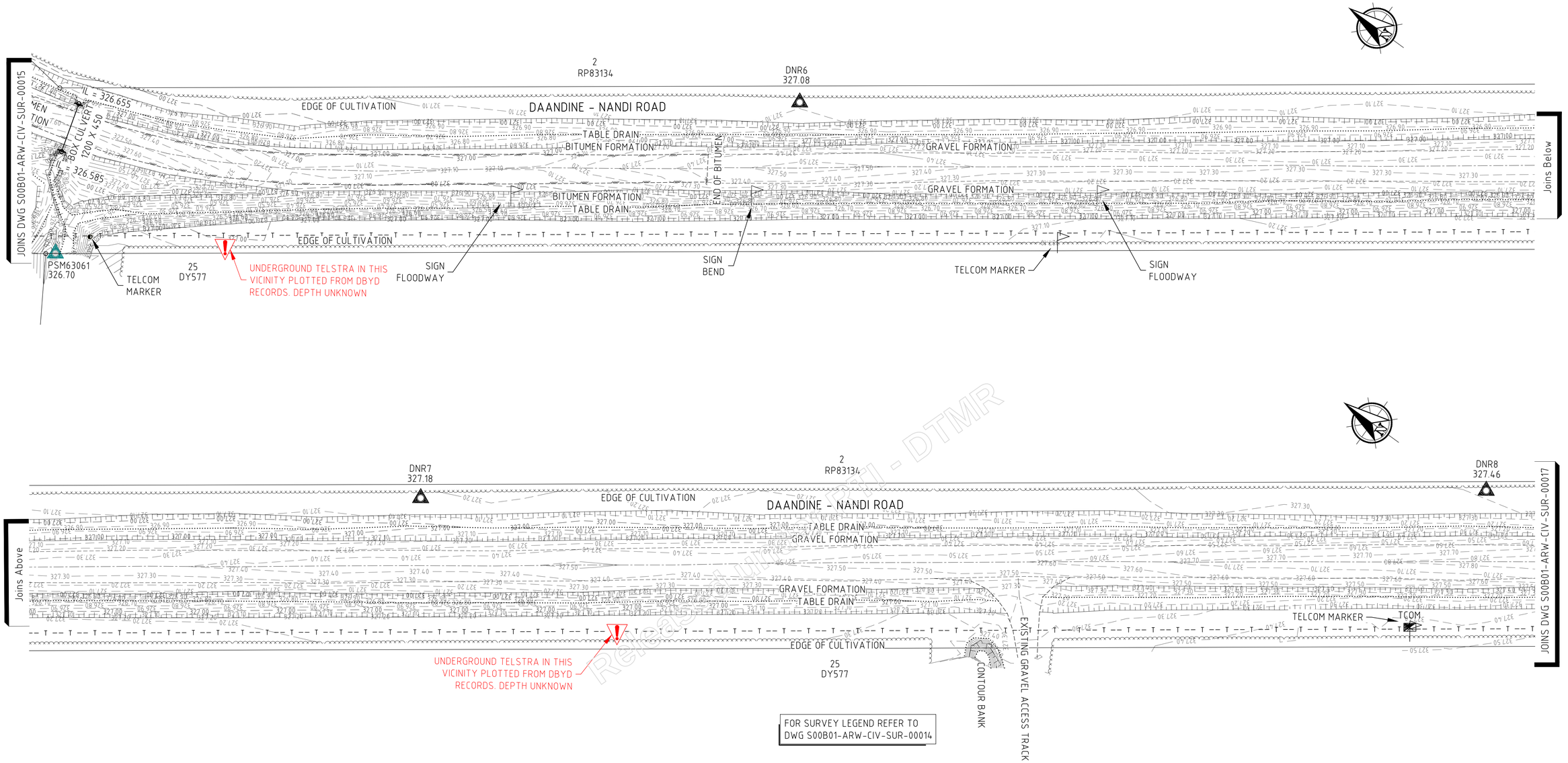
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 2 OF 6

DRAWING No.: S00B01-ARW-CIV-SUR-00015

SCALE: 1:500m

REV: 0

A1



10 0 10 20 30 40 50m

SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-SUR-00017	SURVEY SHEET 4 OF 6							
S00B01-ARW-CIV-SUR-00015	SURVEY SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION NR

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C103

SITE S00

PLANT B01

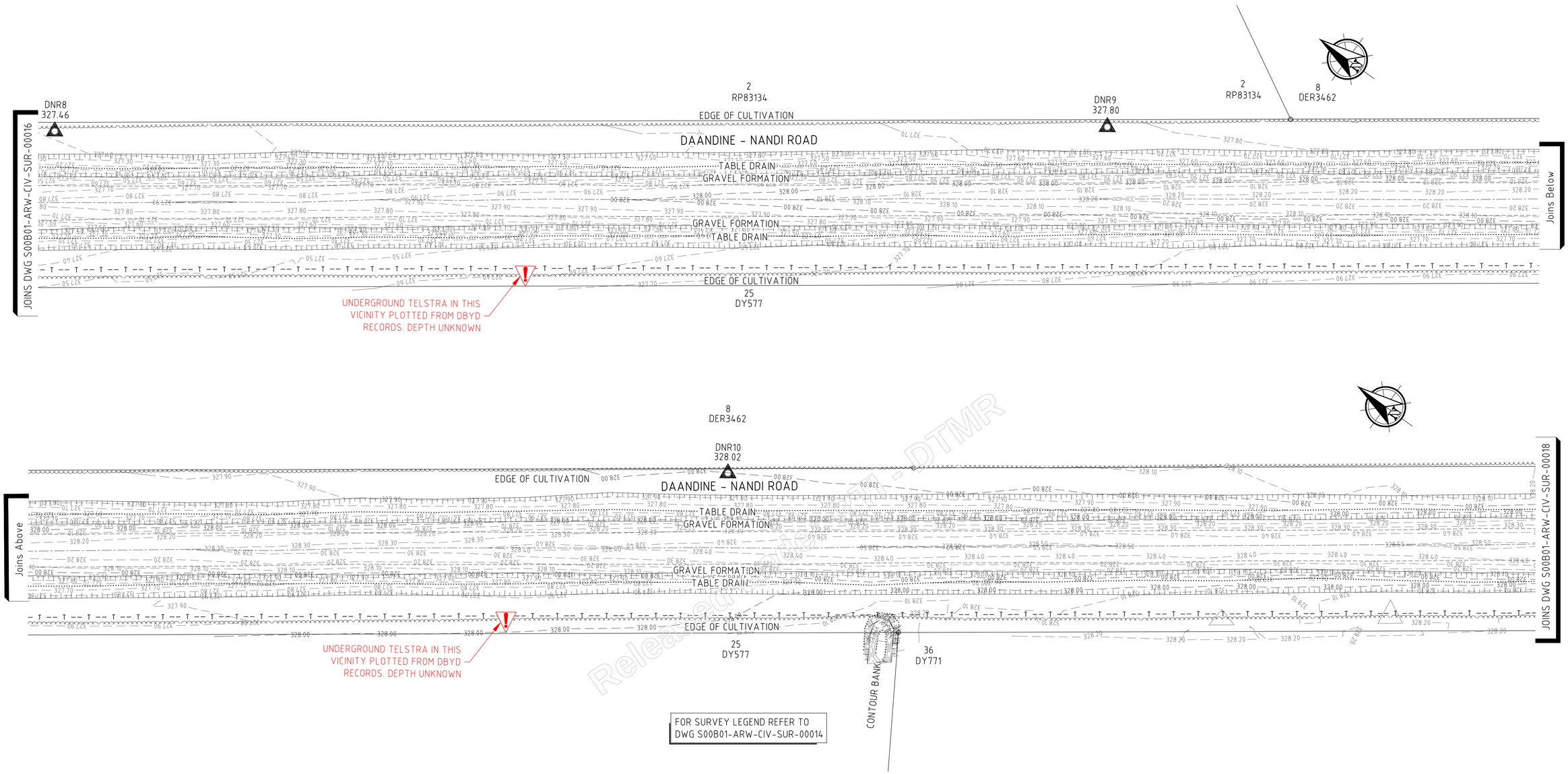
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SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 3 OF 6

DRAWING No. S00B01-ARW-CIV-SUR-00016

SCALE 1:500m

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S00B01-ARW-CIV-SUR-00018	SURVEY SHEET 5 OF 6							
S00B01-ARW-CIV-SUR-00016	SURVEY SHEET 3 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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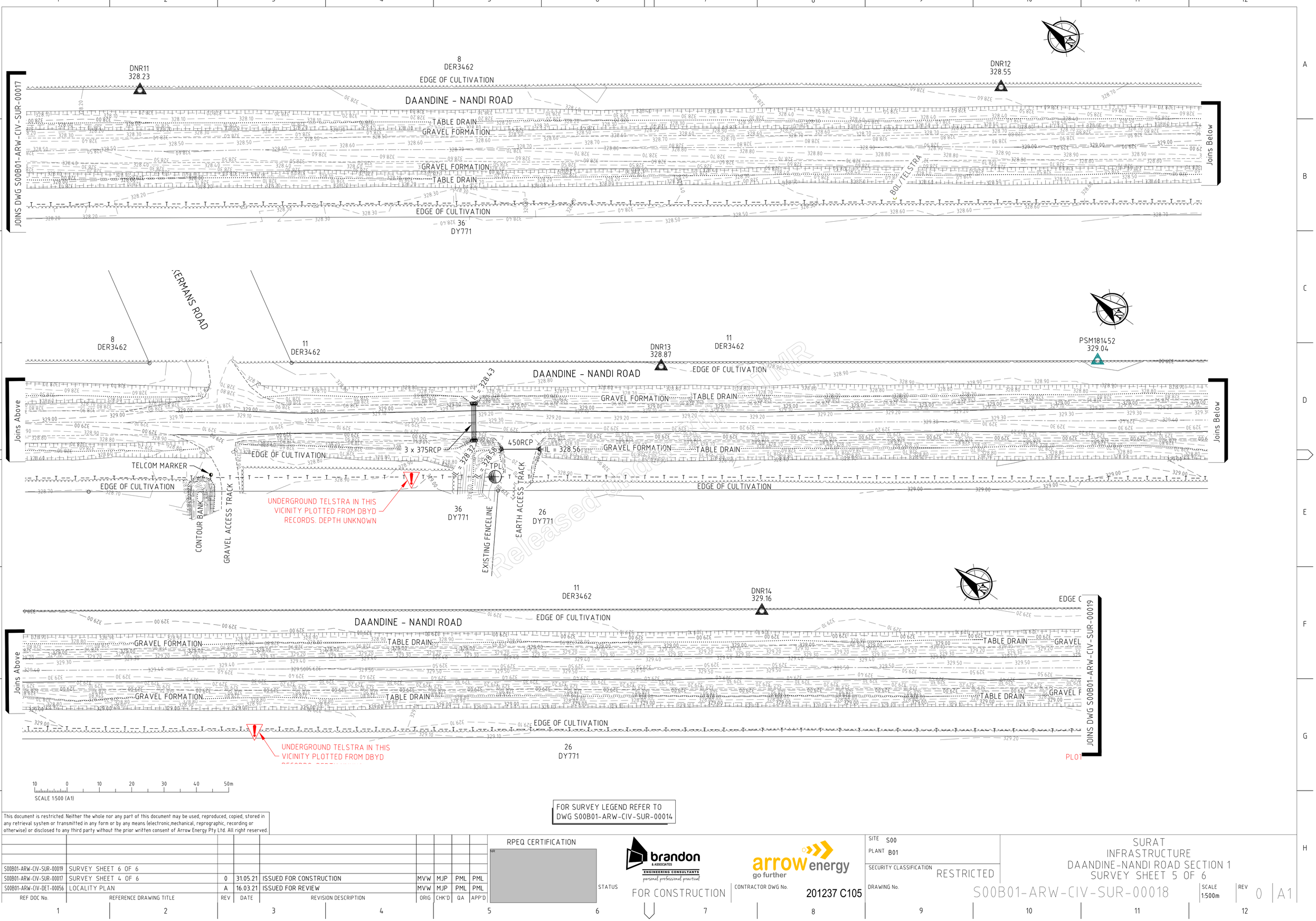
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SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 4 OF 6

STATUS FOR CONSTRUCTION
CONTRACTOR DWG No. 201237 C104
DRAWING No. S00B01-ARW-CIV-SUR-00017
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FOR SURVEY LEGEND REFER TO DWG S00B01-ARW-CIV-SUR-00014

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S00B01-ARW-CIV-SUR-00017	SURVEY SHEET 4 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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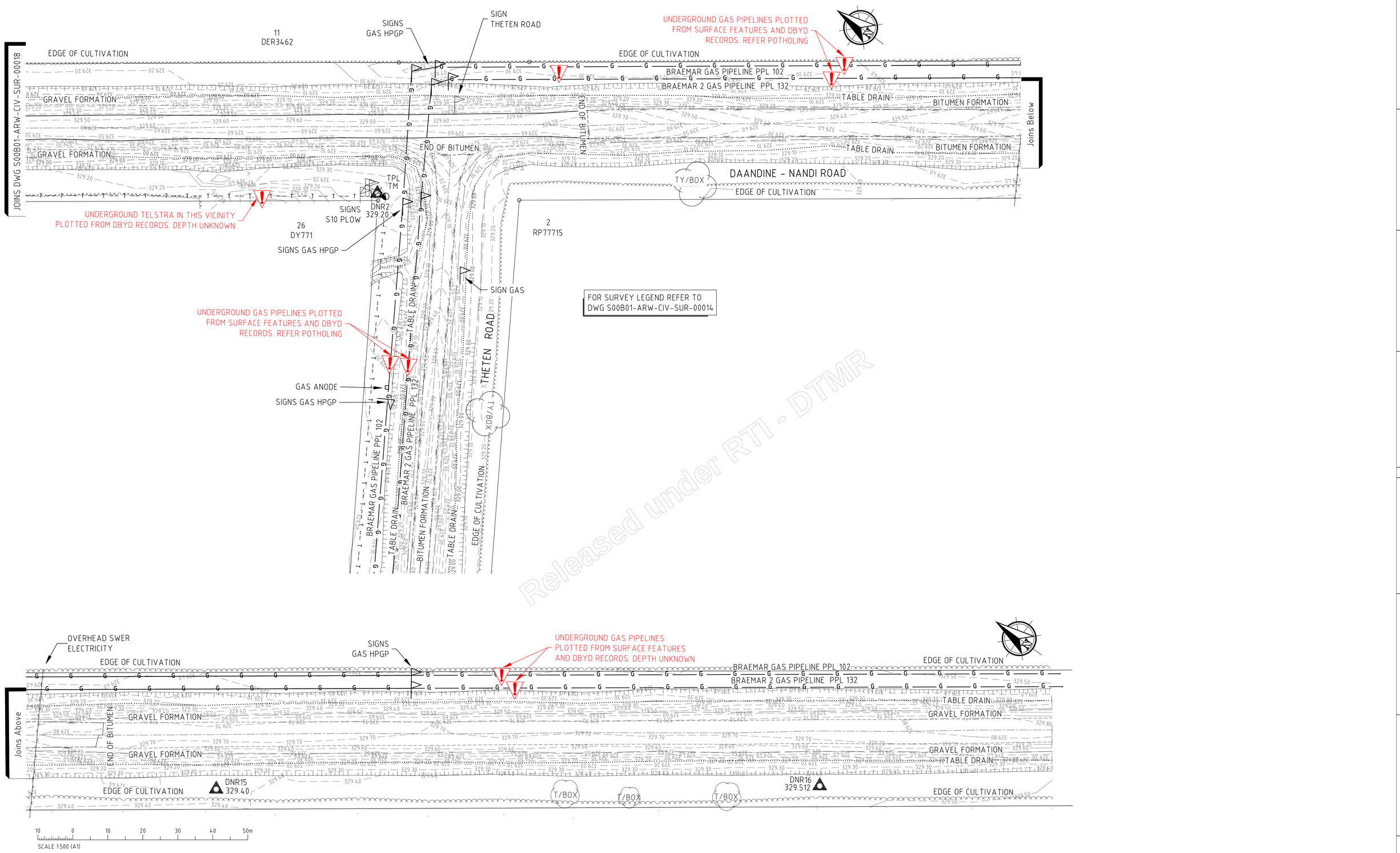
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CONTRACTOR DWG No. 201237 C105

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PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 5 OF 6

DRAWING No. S00B01-ARW-CIV-SUR-00018
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S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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CONTRACTOR DWG No. 201237 C106

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PLANT B01
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SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 6 OF 6

DRAWING No. S00B01-ARW-CIV-SUR-00019 | SCALE 1:500m | REV 0 | A1

ALL SIGNAGE & PAVEMENT MARKING SHALL BE IN ACCORDANCE WITH THE CURRENT "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES"

FOR SURVEY LEGEND REFER TO DWG S00B01-ARW-CIV-SUR-00014

FOR TYPE CROSS SECTIONS REFER DWG S00B01-ARW-CIV-DET-00057

CLEAR ZONES SHALL BE FREE OF NON-FRANGIBLE OBJECTS. REFER ROAD LANDSCAPE MANUAL PART C CHAPTER 5 - SAFETY PAR. 5.6.1

LEGEND

SYMBOL	DESCRIPTION
301.00	DESIGN CONTOUR MAJOR 1.0m
	DESIGN CONTROL LINE ROAD
	DESIGN CONTROL LINE ROAD TURNING POINT
	DESIGN CONTROL LINE ROAD CREST
	DESIGN CONTROL LINE ROAD SAG
	DESIGN ROAD EDGE OF BITUMEN
	DESIGN EDGE OF GRAVEL SHOULDER
	DESIGN DRAIN
	DESIGN INTERFACE
	CLEAR ZONE

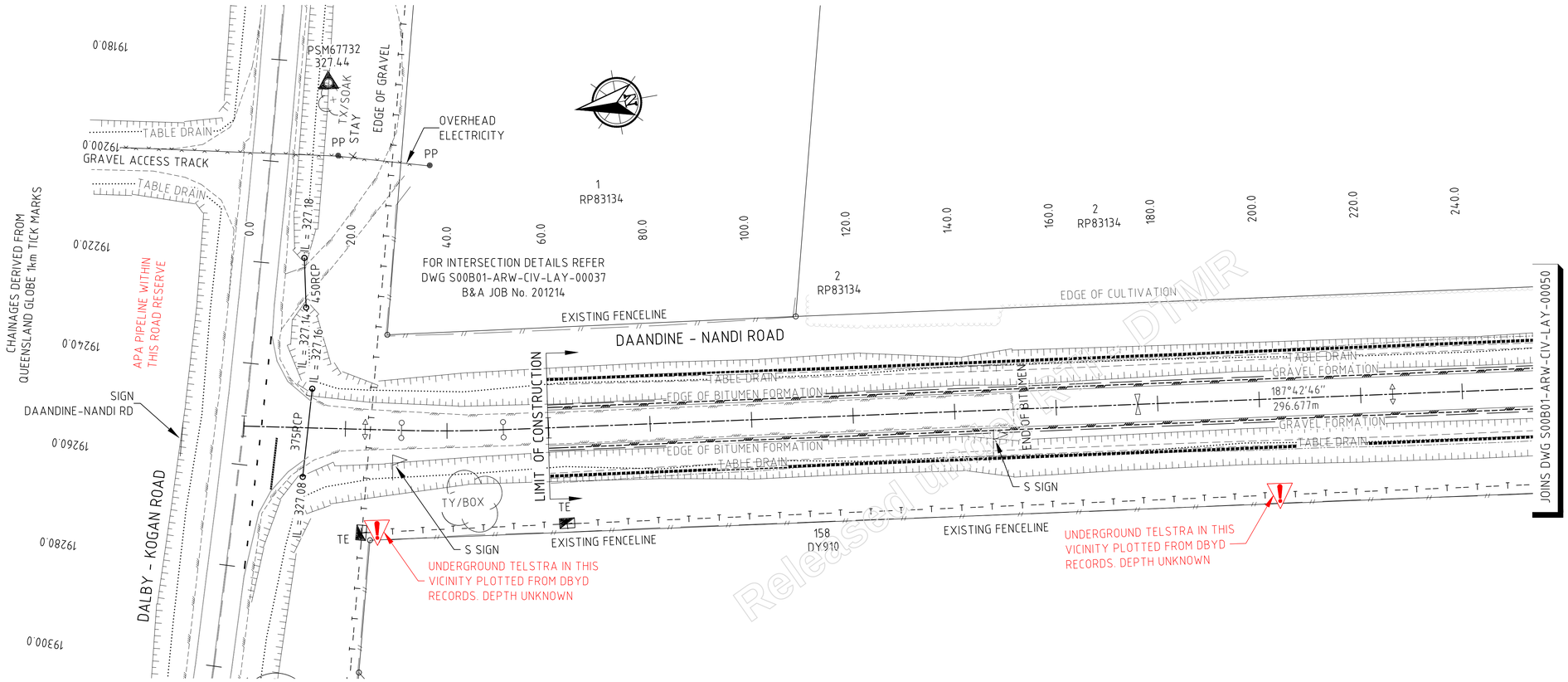


TABLE DRAINS AND DIVERSION DRAINS

TABLE DRAINS AND FLAT BOTTOMED DIVERSION DRAINS SHALL BE INCORPORATED WHERE PRACTICAL IN THE VERGE ALONG BOTH SIDES OF THE ROAD. REFER DEPARTMENT OF MAIN ROADS STD. DWG. 1178

UNLESS SPECIFIED OTHERWISE, DIVERSION DRAINS SHALL BE SPACED AS FOLLOWS:-

LONGITUDINAL GRADIENTS UP TO 2%	120 m
LONGITUDINAL GRADIENTS 2% TO 4%	60 m
LONGITUDINAL GRADIENTS 4% TO 8%	30 m
LONGITUDINAL GRADIENTS GREATER THAN 8%	15 m

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

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S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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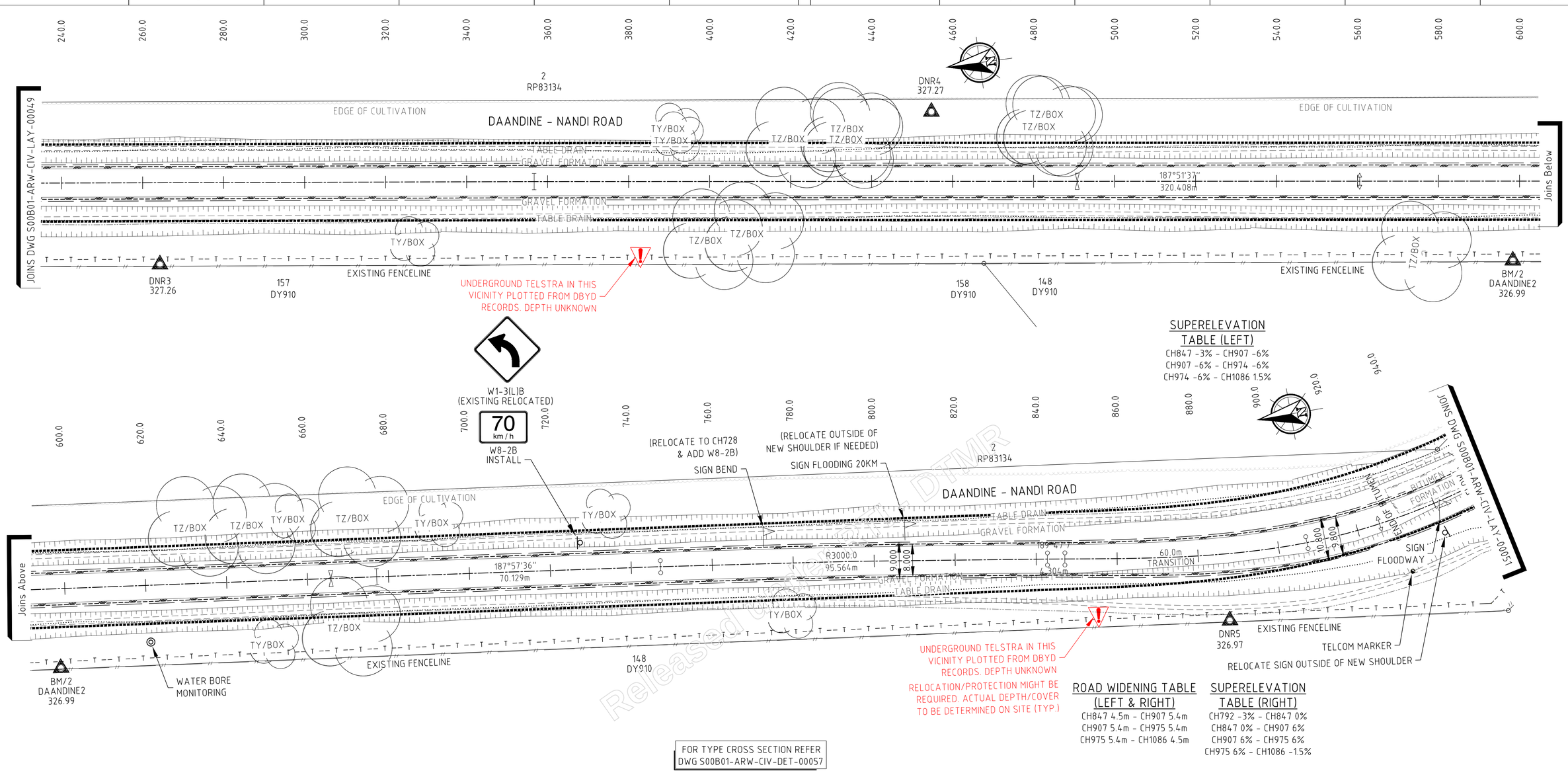
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CONTRACTOR DWG No. 201237 C110

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PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 1 OF 6

DRAWING No. S00B01-ARW-CIV-LAY-00049
SCALE 1:500m
REV 0
A1



SUPERELEVATION TABLE (LEFT)

CH847 -3% - CH907 -6%
CH907 -6% - CH974 -6%
CH974 -6% - CH1086 1.5%

ROAD WIDENING TABLE (LEFT & RIGHT)

CH847 4.5m - CH907 5.4m
CH907 5.4m - CH975 5.4m
CH975 5.4m - CH1086 4.5m

SUPERELEVATION TABLE (RIGHT)

CH792 -3% - CH847 0%
CH847 0% - CH907 6%
CH907 6% - CH975 6%
CH975 6% - CH1086 -1.5%

FOR TYPE CROSS SECTION REFER
DWG S00B01-ARW-CIV-DET-00057

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6							
S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C111

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

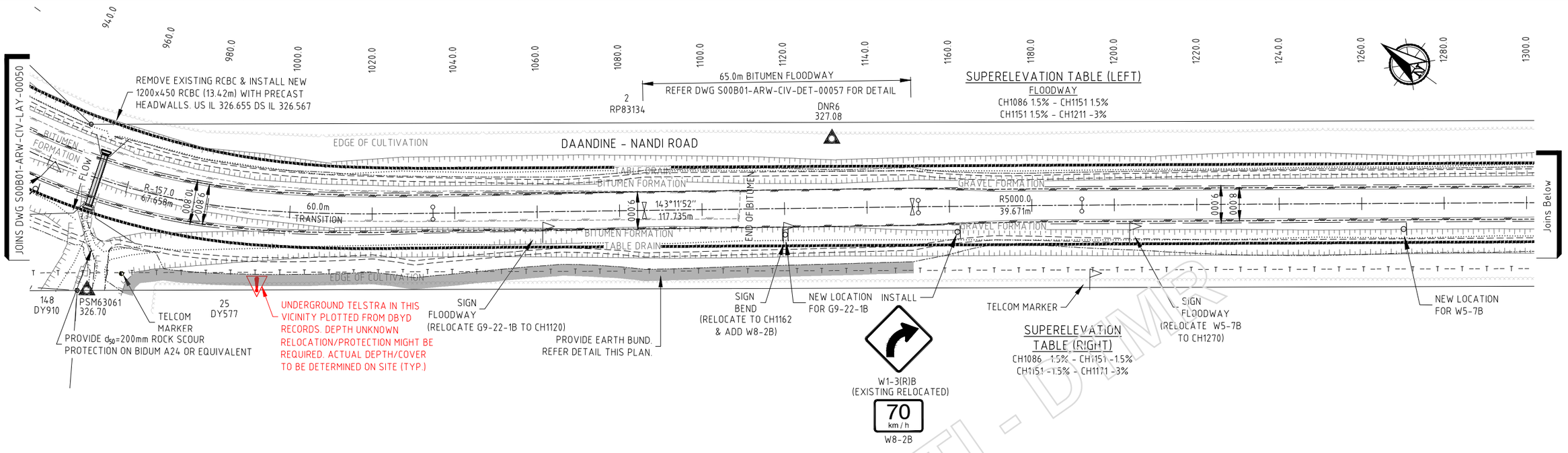
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 2 OF 6

DRAWING No. S00B01-ARW-CIV-LAY-00050

SCALE 1:500m

REV 0

A1



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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6	1	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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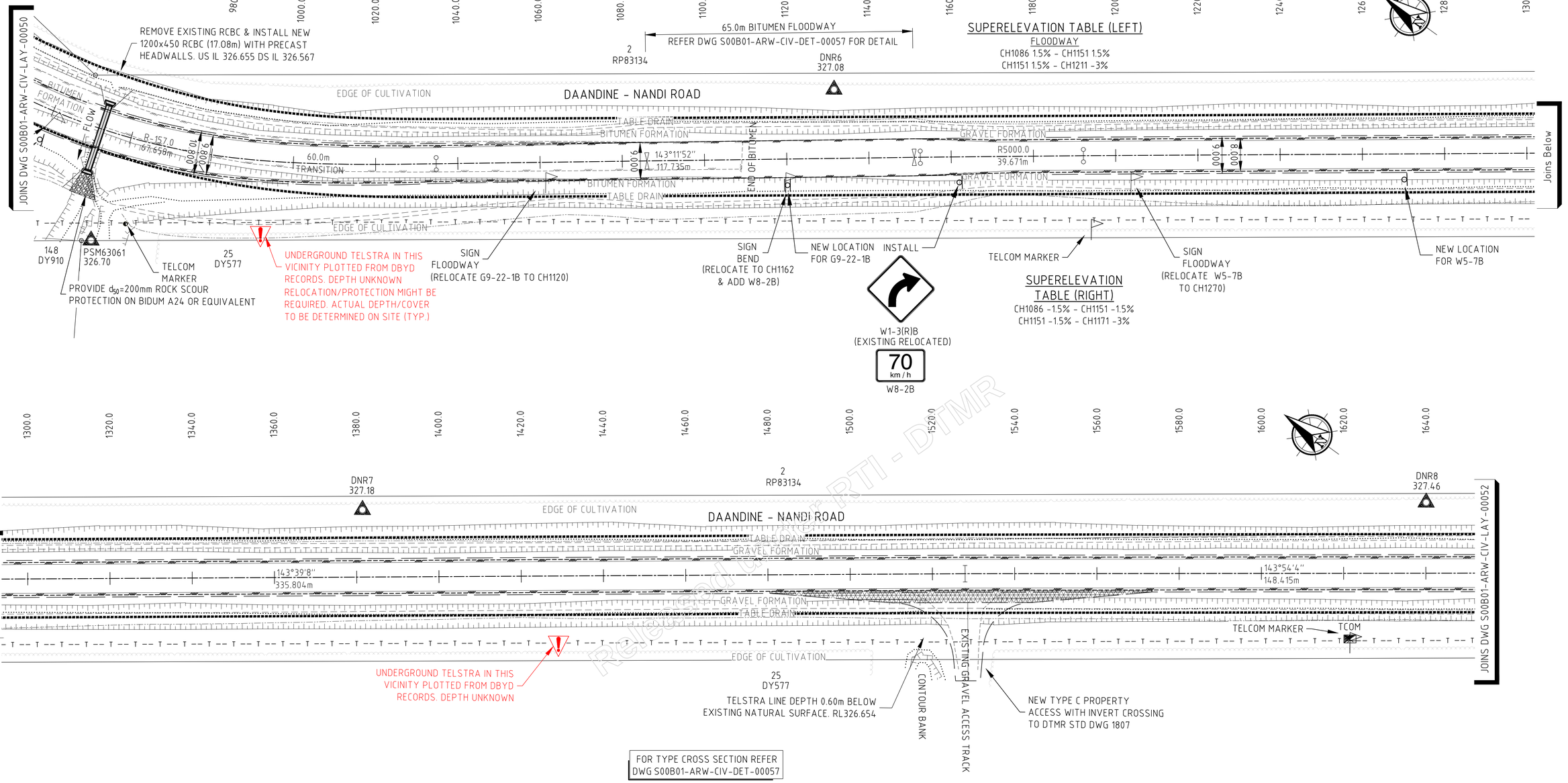
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SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED
DRAWING No. S00B01-ARW-CIV-LAY-00051

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 3 OF 6

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10 0 10 20 30 40 50m
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S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6							
S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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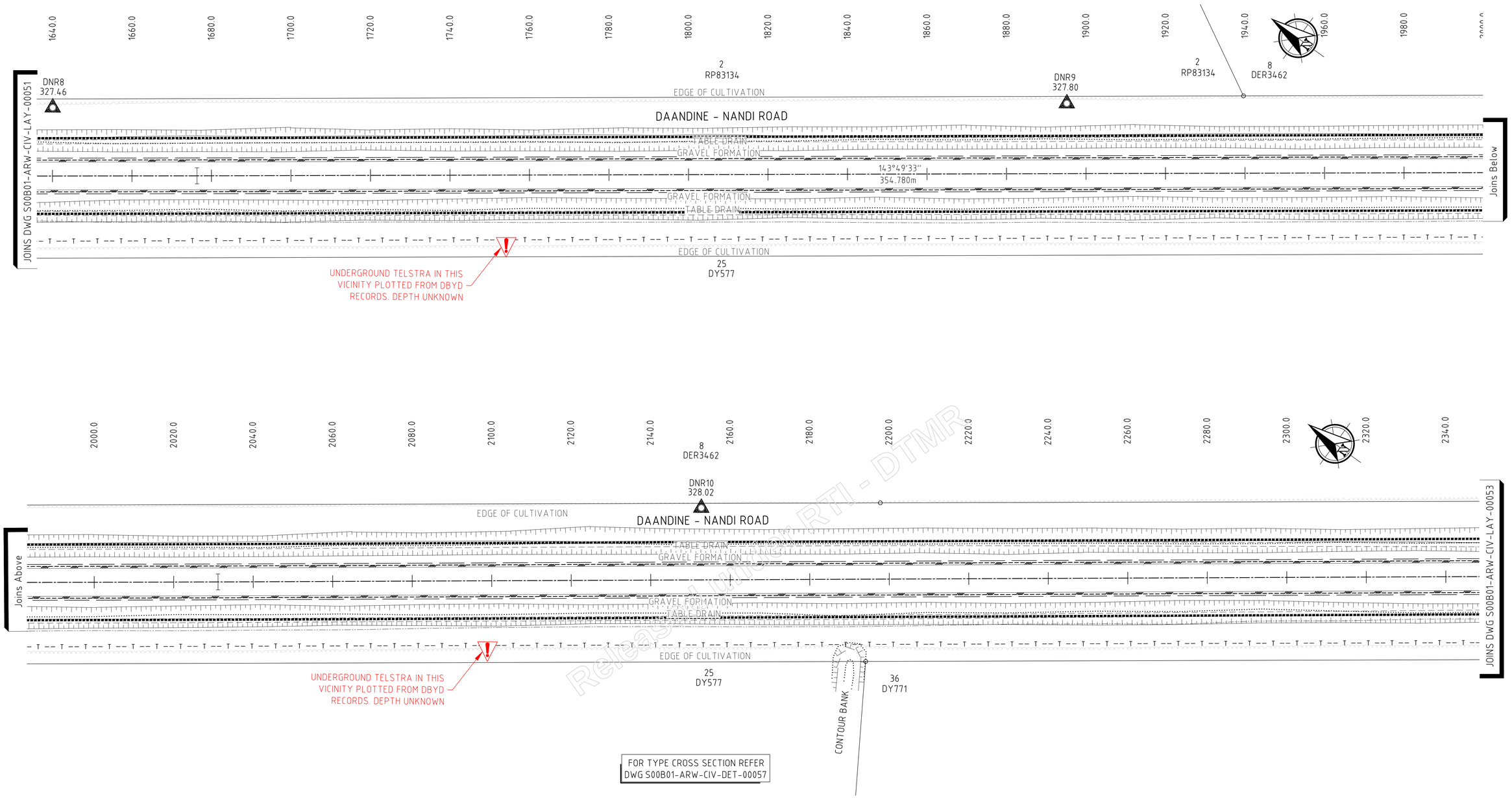
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SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 3 OF 6

STATUS FOR CONSTRUCTION
CONTRACTOR DWG No. 201237 C112
DRAWING No. S00B01-ARW-CIV-LAY-00051
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S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6							
S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 4 OF 6

DRAWING No. S00B01-ARW-CIV-LAY-00052

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S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6							
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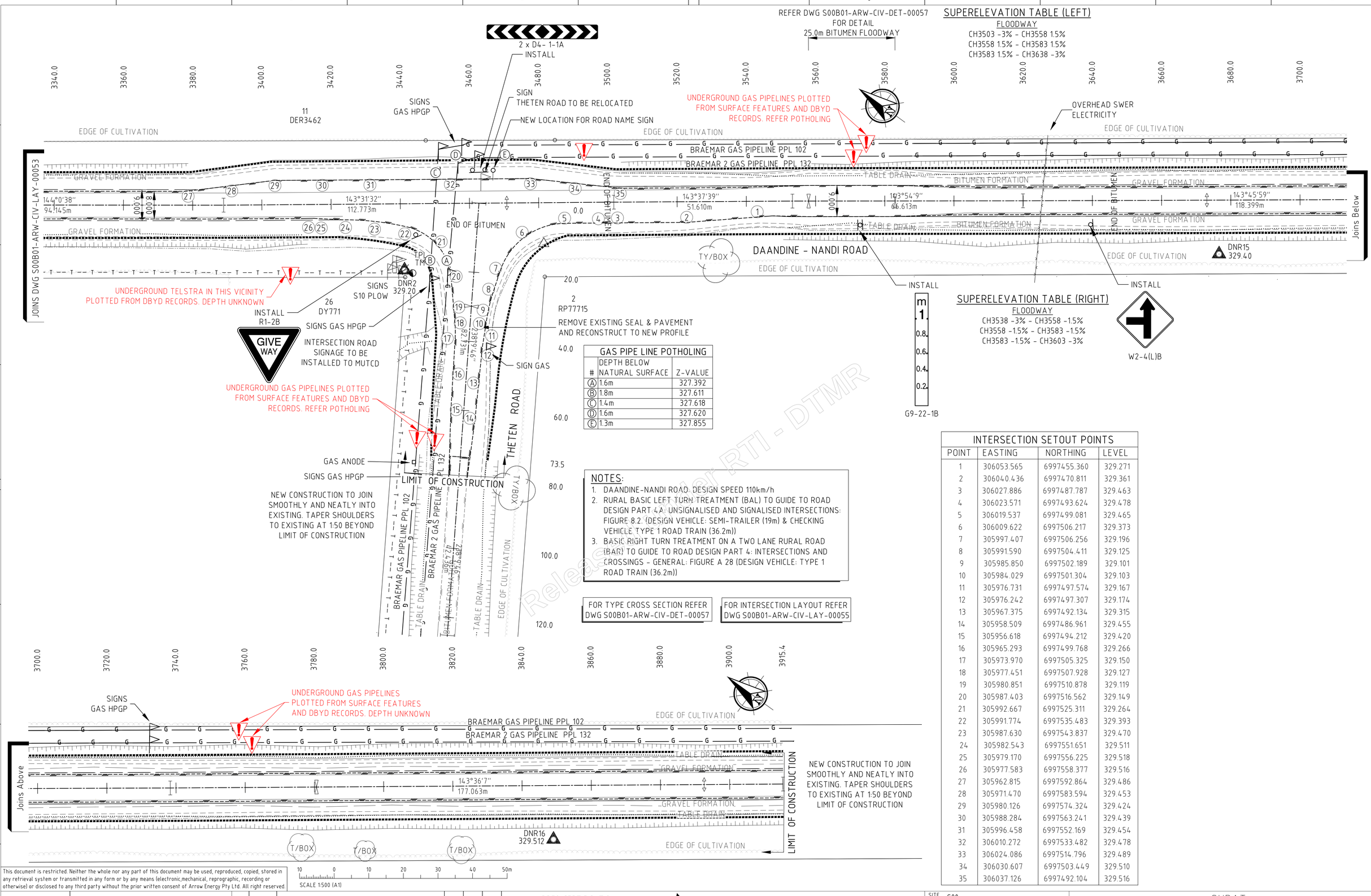
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SITE	S00
PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED
STATUS	FOR CONSTRUCTION
CONTRACTOR DWG No.	201237 C114
DRAWING No.	S00B01-ARW-CIV-LAY-00053
SCALE	1:500m
REV	0
	A1

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 5 OF 6



SUPERELEVATION TABLE (LEFT)

FLOODWAY

CH3503 -3% - CH3558 1.5%
CH3558 1.5% - CH3583 1.5%
CH3583 1.5% - CH3638 -3%

SUPERELEVATION TABLE (RIGHT)

FLOODWAY

CH3538 -3% - CH3558 -1.5%
CH3558 -1.5% - CH3583 -1.5%
CH3583 -1.5% - CH3603 -3%

GAS PIPE LINE POTHOLING

#	DEPTH BELOW NATURAL SURFACE	Z-VALUE
A	1.6m	327.392
B	1.8m	327.611
C	1.4m	327.618
D	1.6m	327.620
E	1.3m	327.855

INTERSECTION SETOUT POINTS

POINT	EASTING	NORTHING	LEVEL
1	306053.565	6997455.360	329.271
2	306040.436	6997470.811	329.361
3	306027.886	6997487.787	329.463
4	306023.571	6997493.624	329.478
5	306019.537	6997499.081	329.465
6	306009.622	6997506.217	329.373
7	305997.407	6997506.256	329.196
8	305991.590	6997504.411	329.125
9	305985.850	6997502.189	329.101
10	305984.029	6997501.304	329.103
11	305976.731	6997497.574	329.167
12	305976.242	6997497.307	329.174
13	305967.375	6997492.134	329.315
14	305958.509	6997486.961	329.455
15	305956.618	6997494.212	329.420
16	305965.293	6997499.768	329.266
17	305973.970	6997505.325	329.150
18	305977.451	6997507.928	329.127
19	305980.851	6997510.878	329.119
20	305987.403	6997516.562	329.149
21	305992.667	6997525.311	329.264
22	305991.774	6997535.483	329.393
23	305987.630	6997543.837	329.470
24	305982.543	6997551.651	329.511
25	305979.170	6997556.225	329.518
26	305977.583	6997558.377	329.516
27	305962.815	6997592.864	329.486
28	305971.470	6997583.594	329.453
29	305980.126	6997574.324	329.424
30	305988.284	6997563.241	329.439
31	305996.458	6997552.169	329.454
32	306010.272	6997533.482	329.478
33	306024.086	6997514.796	329.489
34	306030.607	6997503.449	329.510
35	306037.126	6997492.104	329.516

NOTES:

1. DAANDINE-NANDI ROAD: DESIGN SPEED 110km/h
2. RURAL BASIC LEFT TURN TREATMENT (BAL) TO GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS: FIGURE 8.2. (DESIGN VEHICLE: SEMI-TRAILER (19m) & CHECKING VEHICLE TYPE 1 ROAD TRAIN (36.2m))
3. BASIC RIGHT TURN TREATMENT ON A TWO LANE RURAL ROAD (BAR) TO GUIDE TO ROAD DESIGN PART 4: INTERSECTIONS AND CROSSINGS - GENERAL: FIGURE A 28 (DESIGN VEHICLE: TYPE 1 ROAD TRAIN (36.2m))

FOR TYPE CROSS SECTION REFER DWG S00B01-ARW-CIV-DET-00057

FOR INTERSECTION LAYOUT REFER DWG S00B01-ARW-CIV-LAY-00055

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S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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STATUS FOR CONSTRUCTION

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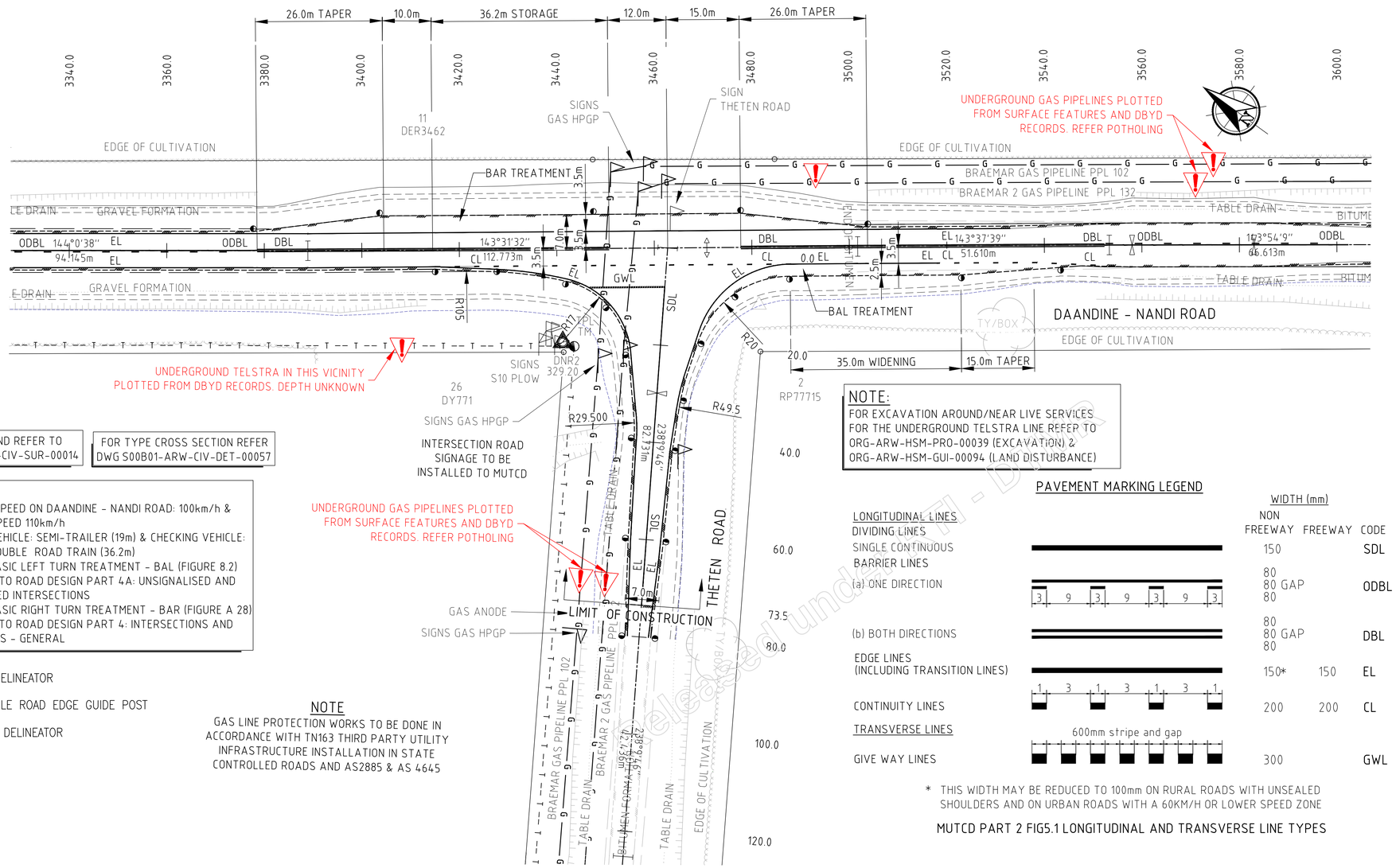
SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 6 OF 6

DRAWING No. S00B01-ARW-CIV-LAY-00054

SCALE 1:500m

REV 0 A1



FOR SURVEY LEGEND REFER TO DWG S00B01-ARW-CIV-SUR-00014

FOR TYPE CROSS SECTION REFER DWG S00B01-ARW-CIV-DET-00057

NOTES:

1. POSTED SPEED ON DAANDINE - NANDI ROAD: 100km/h & DESIGN SPEED 110km/h
2. DESIGN VEHICLE: SEMI-TRAILER (19m) & CHECKING VEHICLE: TYPE 1 DOUBLE ROAD TRAIN (36.2m)
3. RURAL BASIC LEFT TURN TREATMENT - BAL (FIGURE 8.2) OF GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS
4. RURAL BASIC RIGHT TURN TREATMENT - BAR (FIGURE A 28) OF GUIDE TO ROAD DESIGN PART 4: INTERSECTIONS AND CROSSINGS - GENERAL

RED DELINEATOR

FLEXIBLE ROAD EDGE GUIDE POST

WHITE DELINEATOR

NOTE

GAS LINE PROTECTION WORKS TO BE DONE IN ACCORDANCE WITH TN163 THIRD PARTY UTILITY INFRASTRUCTURE INSTALLATION IN STATE CONTROLLED ROADS AND AS2885 & AS 4645

NOTE:

FOR EXCAVATION AROUND/NEAR LIVE SERVICES FOR THE UNDERGROUND TELSTRA LINE REFER TO ORG-ARW-HSM-PRO-00039 (EXCAVATION) & ORG-ARW-HSM-GUI-00094 (LAND DISTURBANCE)

PAVEMENT MARKING LEGEND

	WIDTH (mm) FREEWAY	NON FREEWAY	CODE
LONGITUDINAL LINES			
DIVIDING LINES			
SINGLE CONTINUOUS BARRIER LINES	150		SDL
(a) ONE DIRECTION	80 80 GAP 80		ODBL
(b) BOTH DIRECTIONS	80 80 GAP 80		DBL
EDGE LINES (INCLUDING TRANSITION LINES)	150*	150	EL
CONTINUITY LINES	200	200	CL
TRANSVERSE LINES			
GIVE WAY LINES	300		GWL

* THIS WIDTH MAY BE REDUCED TO 100mm ON RURAL ROADS WITH UNSEALED SHOULDERS AND ON URBAN ROADS WITH A 60KM/H OR LOWER SPEED ZONE

MUTCD PART 2 FIG5.1 LONGITUDINAL AND TRANSVERSE LINE TYPES

INTERSECTION SETOUT POINTS

POINT	EASTING	NORTHING	LEVEL
1	306053.565	6997455.360	329.271
2	306040.436	6997470.811	329.361
3	306027.886	6997487.787	329.463
4	306023.571	6997493.624	329.478
5	306019.537	6997499.081	329.465
6	306009.622	6997506.217	329.373
7	305997.407	6997506.256	329.196
8	305991.590	6997504.411	329.125
9	305985.850	6997502.189	329.101
10	305984.029	6997501.304	329.103
11	305976.731	6997497.574	329.167
12	305976.242	6997497.307	329.174
13	305967.375	6997492.134	329.315
14	305958.509	6997486.961	329.455
15	305956.618	6997494.212	329.420
16	305965.293	6997499.768	329.266
17	305973.970	6997505.325	329.150
18	305977.451	6997507.928	329.127
19	305980.851	6997510.878	329.119
20	305987.403	6997516.562	329.149
21	305992.667	6997525.311	329.264
22	305991.774	6997535.483	329.393
23	305987.630	6997543.837	329.470
24	305982.543	6997551.651	329.511
25	305979.170	6997556.225	329.518
26	305977.583	6997558.377	329.516
27	305962.815	6997592.864	329.486
28	305971.470	6997583.594	329.453
29	305980.126	6997574.324	329.424
30	305988.284	6997563.241	329.439
31	305996.458	6997552.169	329.454
32	306010.272	6997533.482	329.478
33	306024.086	6997514.796	329.489
34	306030.607	6997503.449	329.510
35	306037.126	6997492.104	329.516

FOR BENCHMARK SITE-COORDINATES, DATUM AND OTHER SURVEY INFORMATION REFER TO DWG S00B01-ARW-CIV-SUR-00014

10 0 10 20 30 40 50m

SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6							
S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION NR

STATUS FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal. professional. practical

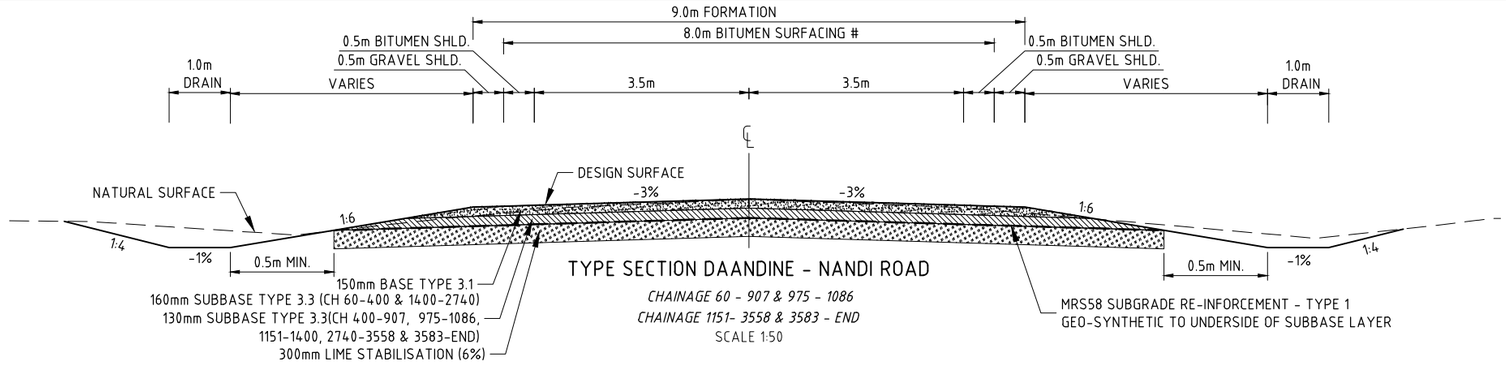
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CONTRACTOR DWG No. 201237 C116

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

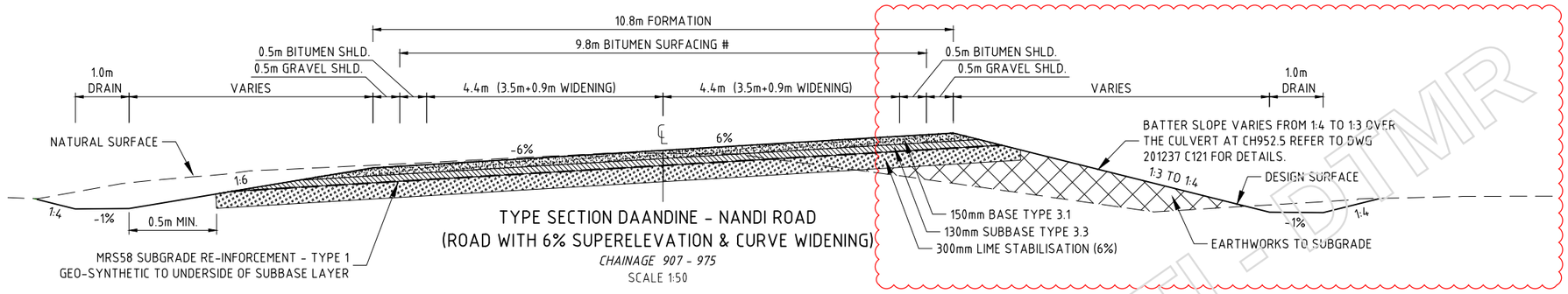
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
THETEN ROAD INTERSECTION LAYOUT

DRAWING No. S00B01-ARW-CIV-LAY-00055 | SCALE 1:500m | REV 0 | A1



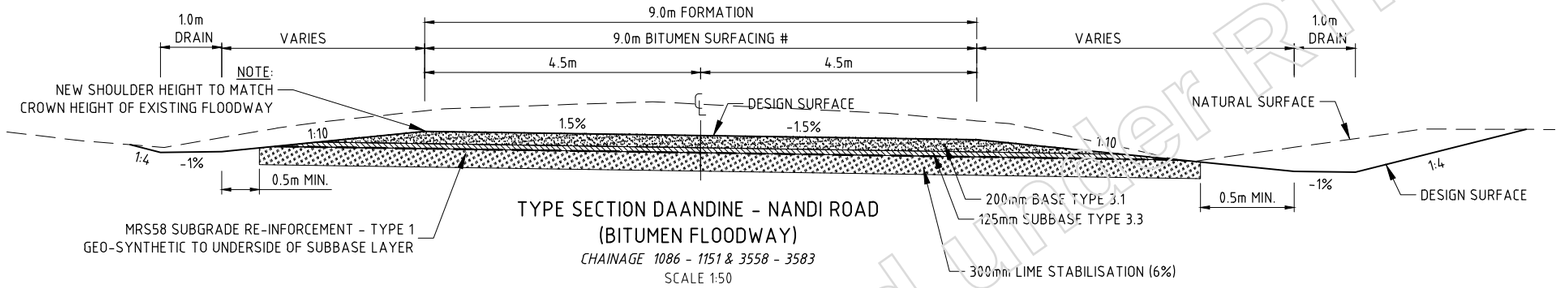
TYPE SECTION DAANDINE - NANDI ROAD

CHAINAGE 60 - 907 & 975 - 1086
CHAINAGE 1151- 3558 & 3583 - END
SCALE 1:50



TYPE SECTION DAANDINE - NANDI ROAD (ROAD WITH 6% SUPERELEVATION & CURVE WIDENING)

CHAINAGE 907 - 975
SCALE 1:50



TYPE SECTION DAANDINE - NANDI ROAD (BITUMEN FLOODWAY)

CHAINAGE 1086 - 1151 & 3558 - 3583
SCALE 1:50

DESIGN TRAFFIC DATA

AADT (2019) 72 VPD
% COMMERCIAL VEHICLES = 25%
% COMMERCIAL VEHICLE GROWTH RATE = 2%
DESIGN LIFE = 20YEARS
DESA = $3.65X10^5$
SUBGRADE CBR 1.5% SOAKED

#BITUMEN SURFACING:

EMULSION PRIME @ 1.0L/m^2
SEAL COAT A CI 170 WITH <2% CUTTER @ 1.5 L/m^2 + 14mm AGG @ 90m^2/m^3
SEAL COAT B S45R @ 1.2 L/m^2 + 10mm AGG @ 130m^2/m^3

SEAL DESIGN TO BE CONFIRMED WITH ENGINEER PRIOR TO COMMENCEMENT OF SURFACING WORKS BASED ON SURFACE CONDITION AND AGGREGATE CHARACTERISTICS

DESIGN CRITERIA:

1. POSTED SPEED 100km\h DESIGN SPEED 110km\h
2. CLEAR ZONE DISTANCES FROM EDGE OF THROUGH TRAVELLED WAY GUIDE TO ROAD DESIGN - PART 6 TABLE 4.1: CUT - 5m FILL - 8m
3. RECOMMENDED SIDE FRICTION FACTORS FOR CARS AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.5: DESIRED MAXIMUM - 0.12 ABSOLUTE MAXIMUM - 0.12
4. MINIMUM RADIUS VALUES AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.6: 667m / 6% SUPERELEVATION
5. DESIGN SUPERELEVATION DEVELOPMENT LENGTHS AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.11: 110m
6. MINIMUM RADIUS WITH ADVERSE CROSSFALL AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.12: 2700m
7. CURVE WIDENING - AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.13 A-DOUBLE TYPE 1 ROAD TRAIN (36.2m) = 0.9m PER LANE
8. MINIMUM SIZE CREST VERTICAL CURVE FOR SEALED ROADS BASED ON STOPPING SIGHT DISTANCE FOR A CAR AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 8.7: DESIRABLE MINIMUM VALUE R_T - 2.0s = K VALUE 83.6m & ABSOLUTE MINIMUM VALUE R_T - 2.0s = K VALUE 60.6m
9. MINIMUM SIZE SAG VERTICAL CURVE FOR RURAL ROADS (COMFORT CRITERIA GOVERN) AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN FIG 8.9: K VALUE 19 - 31m

POSITIONS OF SERVICES SHOWN ARE GIVEN FOR GUIDANCE ONLY. LOCATIONS AND/OR DEPTHS MAY NOT BE ACCURATELY REPRESENTED AND OTHER SERVICES MAY EXIST ON SITE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT A DIAL BEFORE YOU DIG ENQUIRY AND TO VERIFY THE POSITION OF ALL SERVICES ON SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

SPACING OF GUIDE POSTS ON CURVES

CURVE RADIUS (m)	SPACING (m)	
	ON OUTSIDE OF CURVE	ON INSIDE OF CURVE
< 100	6	12
100 - 199	10	20
200 - 299	15	30
300 - 399	20	40
400 - 599	30	60
600 - 799	40	60
800 - 1199	60	60
1200 - 2000	90	90
> 2000	150	150

EACH POST ON THE INSIDE OF A CURVE SHALL BE PLACED OPPOSITE A POST ON THE OUTSIDE OF THE CURVE WHEREVER PRACTICABLE

GUIDE POST NOTES:

GUIDE POSTS ARE TO BE INSTALLED THE LENGTH OF BOTH SIDES OF THE ROAD TO MARK THE EDGE OF ROAD FORMATION.

1. ON STRAIGHTS SECTIONS - THE NOMINAL SPACING OF GUIDE POSTS SHALL BE 150m, WITH POSTS IN PAIRS, ONE EACH SIDE OF THE ROAD FORMATION
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4. AT FLOODWAYS - THE MAXIMUM SPACING OF GUIDE POSTS SHALL BE 25m, WITH THE POSTS IN PAIRS, ONE EACH SIDE OF THE ROAD FORMATION OF THE FLOODWAY
5. AT CULVERTS - AT EACH CULVERT, TWO GUIDE POSTS SHALL BE INSTALLED, ONE AT EACH END OF THE HEADWALL. ADDITIONAL PAIRS OF GUIDE POST AT A MAXIMUM SPACING OF 10m SHALL BE USED IF THE SPACING BETWEEN THE GUIDE POSTS AT EACH END OF THE HEADWALL IS GREATER THAN 10m
6. AREAS SUBJECT TO FOG - NOMINAL SPACING OF GUIDE POSTS MAYBE REDUCED TO 60m ON STRAIGHTS OR CURVES IN AREAS SUBJECT TO FOG

1 0 1 2 3 4 5m
SCALE 1:50 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		3	06.05.22	ISSUED FOR CONSTRUCTGION	JAG	PRH	PML	PML
		2	11.03.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-REP-00004	PAVEMENT DESIGN REPORT	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

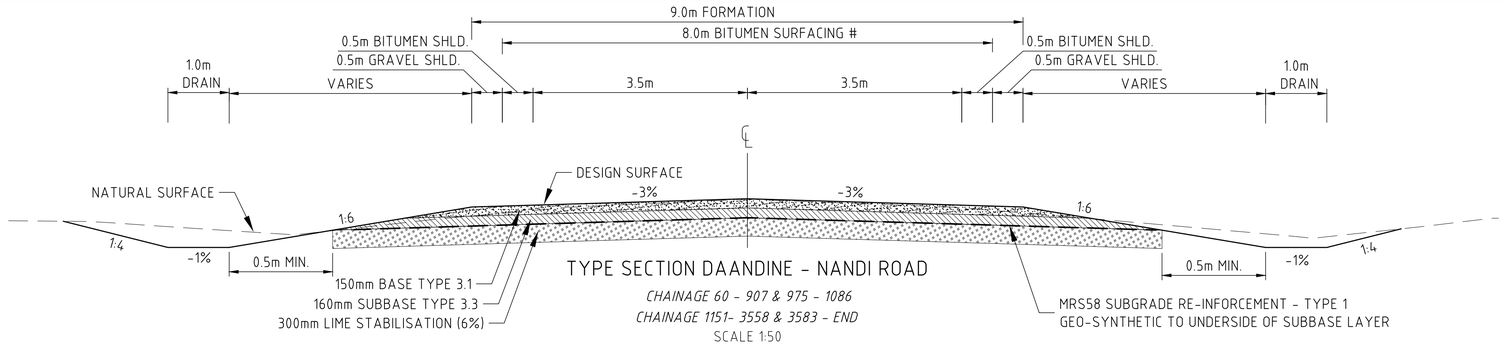
NR
RPEQ CERTIFICATION
NR

brandon & associates ENGINEERING CONSULTANTS personal professional practical

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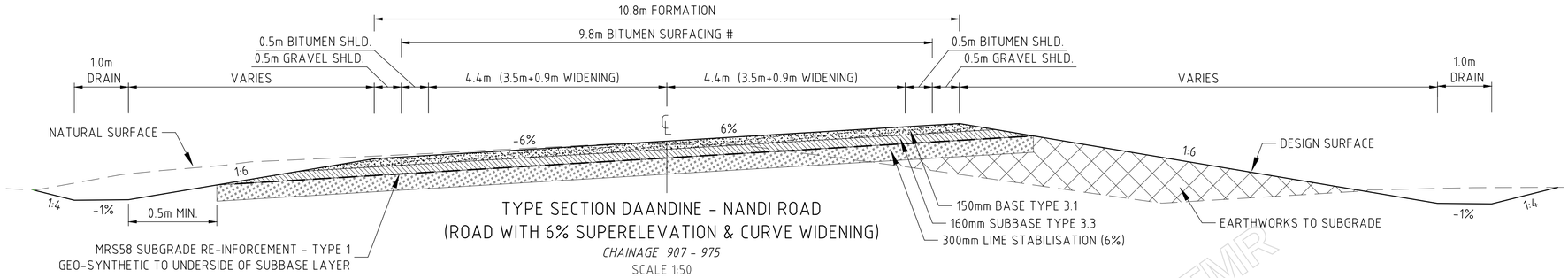
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CONTRACTOR DWG No.	201237 C120
SITE	S00
PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED
DRAWING No.	S00B01-ARW-CIV-DET-00057
SCALE	1:50
REV	3
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SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
TYPICAL SECTIONS AND DETAILS



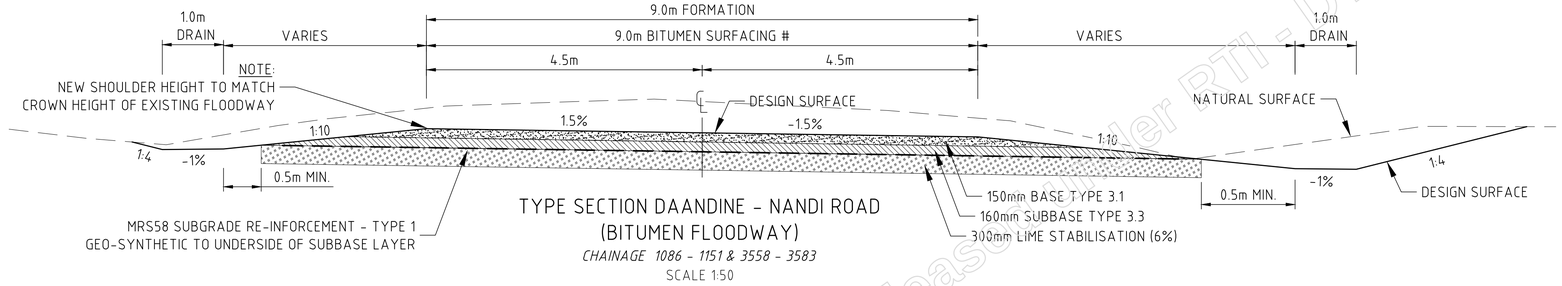
TYPE SECTION DAANDINE - NANDI ROAD

CHAINAGE 60 - 907 & 975 - 1086
CHAINAGE 1151- 3558 & 3583 - END
SCALE 1:50



TYPE SECTION DAANDINE - NANDI ROAD (ROAD WITH 6% SUPERELEVATION & CURVE WIDENING)

CHAINAGE 907 - 975
SCALE 1:50



TYPE SECTION DAANDINE - NANDI ROAD (BITUMEN FLOODWAY)

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1 0 1 2 3 4 5m
SCALE 1:50 (A1)

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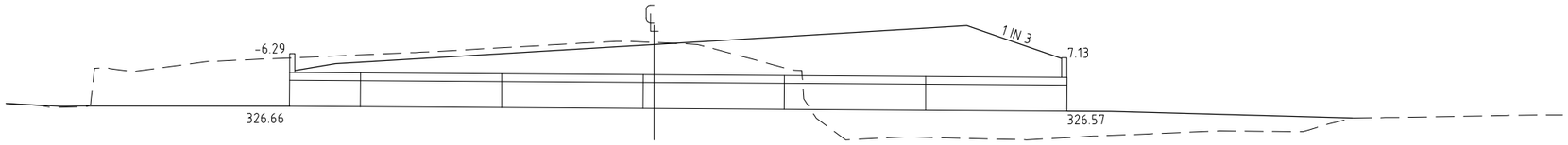
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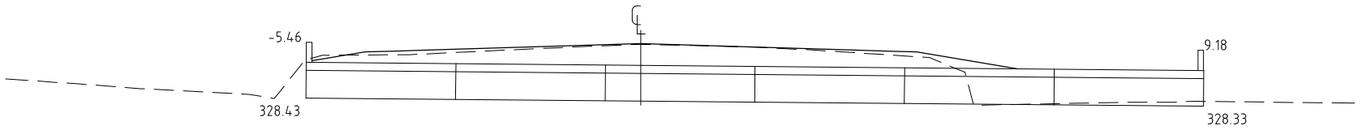
arrow energy go further

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PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED
STATUS	FOR CONSTRUCTION
CONTRACTOR DWG No.	201237 C120
DRAWING No.	S00B01-ARW-CIV-DET-00057
SCALE	1:50
REV	0
	A1

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
TYPICAL SECTIONS AND DETAILS



1200x450 RCBC PRECAST (1/1.22 AND 5/2.44) (13.42 OVERALL LENGTH) CH952.5
BASE SLAB CONC. 3.8m³
PRECAST ENDWALLS
C/O WALL CONC. 0.4m³, HEADWALL EXTENSION CONC. 0.4m³, 54 M12 ANCHOR BARS
STANDARD DRAWINGS - 1359, 1243/2
EXTERNAL BOX WD. 1440mm, INTERNAL HT. 450mm, DECK THICK. 175mm
LEG THICK. 108mm, HEADWALL HT. 325mm, BASESLAB THICK. 180mm

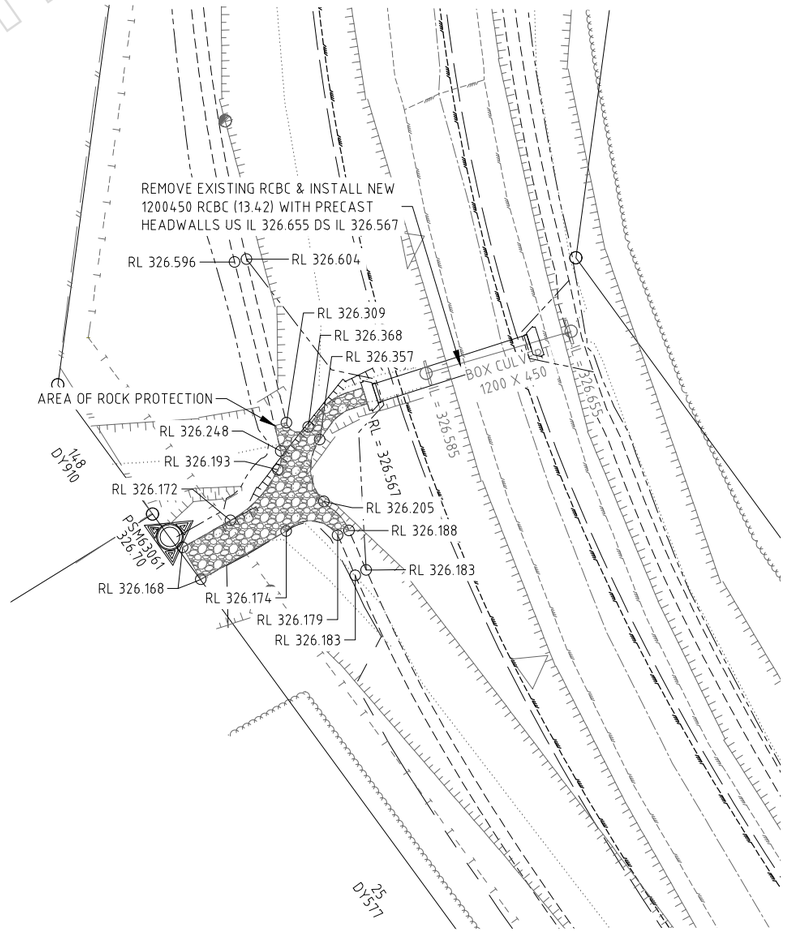


1200x450 RCBC PRECAST (6/2.44) (14.64 OVERALL LENGTH) CH2814.196
BASE SLAB CONC. 4.2m³
PRECAST ENDWALLS
C/O WALL CONC. 0.4m³, HEADWALL EXTENSION CONC. 0.4m³, 54 M12 ANCHOR BARS
STANDARD DRAWINGS - 1359, 1243/2
EXTERNAL BOX WD. 1440mm, INTERNAL HT. 450mm, DECK THICK. 175mm
LEG THICK. 108mm, HEADWALL HT. 325mm, BASESLAB THICK. 180mm

CROSS DRAINAGE QUANTITIES SCHEDULE

CULVERT / CHAINAGE	DRAINAGE STRUCTURE	ENDWALLS / WINGWALLS (U)CONC. (m³)	(R)CONC. (m³)	REINFORCING (m²) (MESH)	CONCRETE BASES CONC. (m³)	REINFORCING RL1218 (m²)	N12 (m)	NIBS (m)	CUT OFF WALLS (m³)	FILL / BACKFILL OLM (m³)	FBM (m³)	BHM (m³)	BSP (m³)	NO FINES CONC. BLOCK	REQ. BAR MASS (kg)	REMARKS
952.50	1200x450 RCBC PRECAST (1/1.22 & 5/2.44)	0.4			3.8	21.3	107.0		0.4			1.9			95	
2814.20	1200x450 RCBC PRECAST (6/2.44)	0.4			4.2	23.2	116.0		0.4			2.1			103	
	TOTAL QUANTITIES	0.8			8.0	44.5	223		0.8			4.0			198	MESH QUANTITIES ARE NET ONLY NO ALLOWANCES MADE FOR LAPS ETC.
	TOTAL MESH	50.2/RL1218 TOTAL NUMBER OF ANCHOR BARS IN PRECAST ENDS 108														

OLM = OVERLAY MATERIAL
FBM = FILL / BACKFILL /SIDE MATERIAL
BHM = BEDDING / HAUNCH MATERIAL
BSP = BEDDING STEEL PIPES



CH952.5 CULVERT LAYOUT PLAN
NOT TO SCALE

1 0 1 2 3 4 5m
SCALE 1:50 (A1)

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S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-REP-00004	PAVEMENT DESIGN REPORT	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

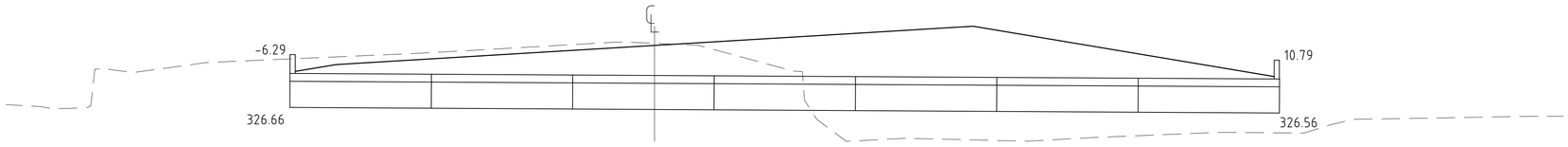
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RPEQ CERTIFICATION
NR

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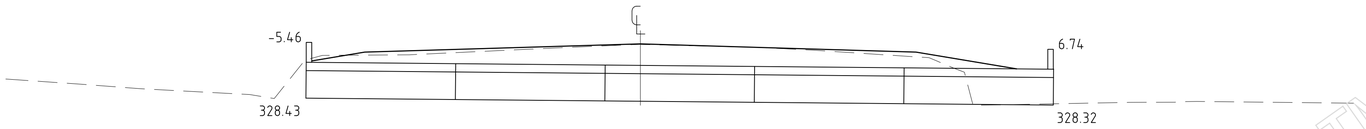
STATUS FOR CONSTRUCTION
CONTRACTOR DWG No. 201237 C121
SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1 DRAINAGE
DETAILS

DRAWING No. S00B01-ARW-CIV-DET-00058
SCALE 1:50m
REV 2
A1



1200x450 RCBC PRECAST (7/2.44) (17.08 OVERALL LENGTH) CH952.5
BASE SLAB CONC. 4.9m³
PRECAST ENDWALLS
C/O WALL CONC. 0.4m³, HEADWALL EXTENSION CONC. 0.4m³, 54 M12 ANCHOR BARS
STANDARD DRAWINGS - 1359, 1243/2
EXTERNAL BOX WD. 1440mm, INTERNAL HT. 450mm, DECK THICK. 175mm
LEG THICK. 108mm, HEADWALL HT. 325mm, BASESLAB THICK. 180mm



1200x450 RCBC PRECAST (5/2.44) (12.2 OVERALL LENGTH) CH2814.196
BASE SLAB CONC. 3.5m³
PRECAST ENDWALLS
C/O WALL CONC. 0.4m³, HEADWALL EXTENSION CONC. 0.4m³, 54 M12 ANCHOR BARS
STANDARD DRAWINGS - 1359, 1243/2
EXTERNAL BOX WD. 1440mm, INTERNAL HT. 450mm, DECK THICK. 175mm
LEG THICK. 108mm, HEADWALL HT. 325mm, BASESLAB THICK. 180mm

CROSS DRAINAGE QUANTITIES SCHEDULE

CULVERT CHAINAGE	DRAINAGE STRUCTURE	ENDWALLS / WINGWALLS (U)CONC. (m^3)	ENDWALLS / WINGWALLS (R)CONC. (m^3)	ENDWALLS / WINGWALLS REINFORCING (m^2)	ENDWALLS / WINGWALLS REINFORCING (MESH)	CONCRETE BASES CONC. (m^3)	CONCRETE BASES REINFORCING RL1218 (m^2)	CONCRETE BASES REINFORCING N12 (m)	CONCRETE BASES REINFORCING NIBS (m)	CUT OFF WALLS (m^3)	FILL / BACKFILL OLM (m^3)	FILL / BACKFILL FBM (m^3)	FILL / BACKFILL BHM (m^3)	FILL / BACKFILL BSP (m^3)	NO FINES CONC. BLOCK	REQ. BAR MASS (kg)	REMARKS
952.50	1200x450 RCBC PRECAST (7/2.44)	0.4				4.9	27.0	136.0		0.4			2.5			121	
2814.20	1200x450 RCBC PRECAST (5/2.44)	0.4				3.5	19.4	97.0		0.4			1.8			86	
	TOTAL QUANTITIES	0.9				8.4	46.4	233		0.7			4			206	MESH QUANTITIES ARE NET ONLY NO ALLOWANCES MADE FOR LAPS ETC.
	TOTAL MESH	46.4/RL1218 TOTAL NUMBER OF ANCHOR BARS IN PRECAST ENDS 108															

OLM = OVERLAY MATERIAL
FBM = FILL / BACKFILL /SIDE MATERIAL
BHM = BEDDING / HAUNCH MATERIAL
BSP = BEDDING STEEL PIPES

1 0 1 2 3 4 5m
SCALE 1:50 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6							
S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-REP-00004	PAVEMENT DESIGN REPORT	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION
NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

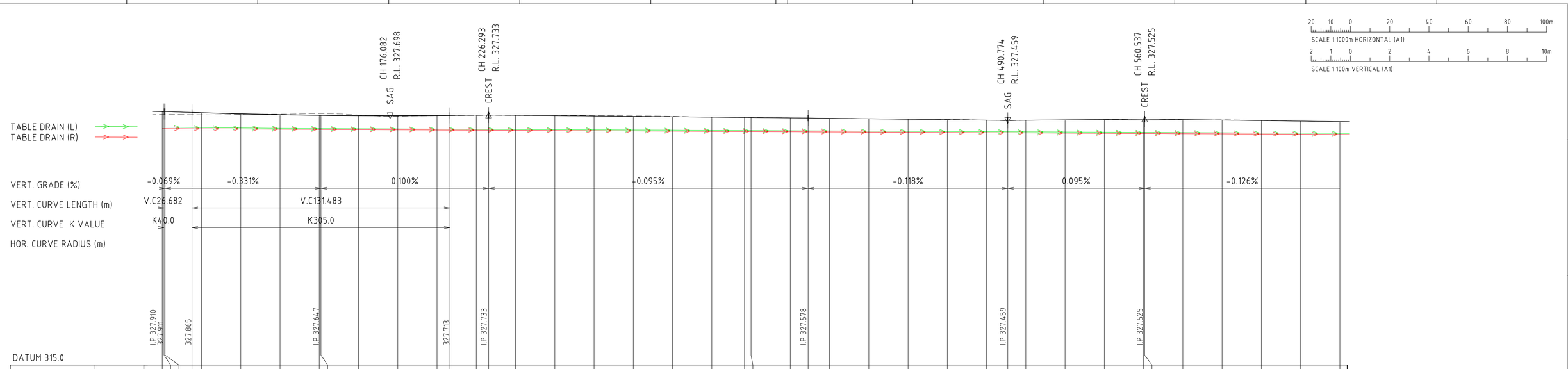
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STATUS FOR CONSTRUCTION
CONTRACTOR DWG No. 201237 C121

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
DRAINAGE DETAIL

DRAWING No. S00B01-ARW-CIV-DET-00058
SCALE 1:50m
REV 0
A1



DATUM 315.0

EARTHWORKS	CUT		98.6	113.7	131.7	150.7	156.3	135.8	132.6	132.1	131.4	135.7	139.0	144.4	147.9	143.8	134.2	133.1	127.8	129.7	138.6	144.2	140.4	134.1	134.0	128.9	124.8	123.2	127.7	131.5	131.8	131.7
	FILL		11.6	6.0	5.7	3.1	1.0	1.4	2.0	2.4	2.5	1.8	1.7	1.2	1.3	1.0	1.3	2.0	2.0	1.4	1.0	1.1	1.3	0.8	1.0	1.3	2.3	3.1	2.6	3.1	2.0	1.3
GUIDE POSTS (L)		□								□							□								□							□
GUIDE POSTS (R)		■								■							■								■							■
DRAIN (R)		327.037	327.037	327.030	327.027	327.018	327.008	326.998	326.997	326.988	326.978	326.968	326.965	326.959	326.956	326.949	326.939	326.929	326.919	326.910	326.900	326.892	326.890	326.880	326.876	326.870	326.860	326.851	326.841	326.831	326.826	326.821	326.811	326.802	326.792	326.791	326.782	326.772	326.762	326.752	326.743
DRAIN (L)		327.114	327.113	327.099	327.094	327.073	327.053	327.042	327.042	327.033	327.023	327.014	327.011	327.005	327.002	326.995	326.986	326.977	326.967	326.958	326.949	326.941	326.939	326.930	326.926	326.921	326.911	326.902	326.893	326.883	326.878	326.874	326.865	326.855	326.846	326.846	326.836	326.827	326.818	326.808	326.799
SHOULDER (L)		327.776	327.776	327.730	327.714	327.658	327.614	327.584	327.583	327.567	327.563	327.572	327.578	327.591	327.598	327.585	327.566	327.547	327.528	327.509	327.490	327.474	327.471	327.452	327.443	327.431	327.407	327.384	327.360	327.336	327.324	327.333	327.352	327.371	327.390	327.390	327.366	327.340	327.315	327.290	327.265
SHOULDER (R)		327.776	327.776	327.730	327.714	327.658	327.614	327.584	327.583	327.567	327.563	327.572	327.578	327.591	327.598	327.585	327.566	327.547	327.528	327.509	327.490	327.474	327.471	327.452	327.443	327.431	327.407	327.384	327.360	327.336	327.324	327.333	327.352	327.371	327.390	327.390	327.366	327.340	327.315	327.290	327.265
EXISTING SURFACE LEVEL		327.763	327.764	327.752	327.745	327.768	327.779	327.796	327.795	327.735	327.669	327.697	327.702	327.711	327.718	327.709	327.710	327.705	327.692	327.671	327.625	327.622	327.618	327.592	327.578	327.561	327.543	327.524	327.508	327.474	327.440	327.461	327.482	327.479	327.524	327.525	327.479	327.492	327.463	327.425	327.398
DESIGN CL LEVEL		327.911	327.911	327.865	327.849	327.793	327.749	327.719	327.718	327.702	327.698	327.707	327.713	327.726	327.733	327.720	327.701	327.682	327.663	327.644	327.625	327.609	327.606	327.587	327.578	327.566	327.542	327.519	327.495	327.471	327.459	327.468	327.487	327.506	327.525	327.525	327.501	327.475	327.450	327.425	327.400
CHAINAGE		60.0	60.936	61.412	75.125	80.0	100.0	120.0	140.0	140.867	160.0	180.0	200.0	206.608	220.0	226.293	240.0	260.0	280.0	300.0	320.0	340.0	356.677	360.0	380.0	389.076	400.0	420.0	440.0	460.0	480.0	490.774	500.0	520.0	540.0	560.0	560.537	580.0	600.0	620.0	640.0	660.0
SUPERELEVATION		LHS and RHS -3%																																							

REFER TO DOC. No.
S00B01-ARW-CIV-MTO-00010
FOR EARTHWORKS TOTALS

60 660

LONGITUDINAL SECTION - DAANDINE-NANDI ROAD SECTION 1 (1)
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LSN-00030	LONGITUDINAL SECTIONS SHEET 2 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

brandon & associates ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C130

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

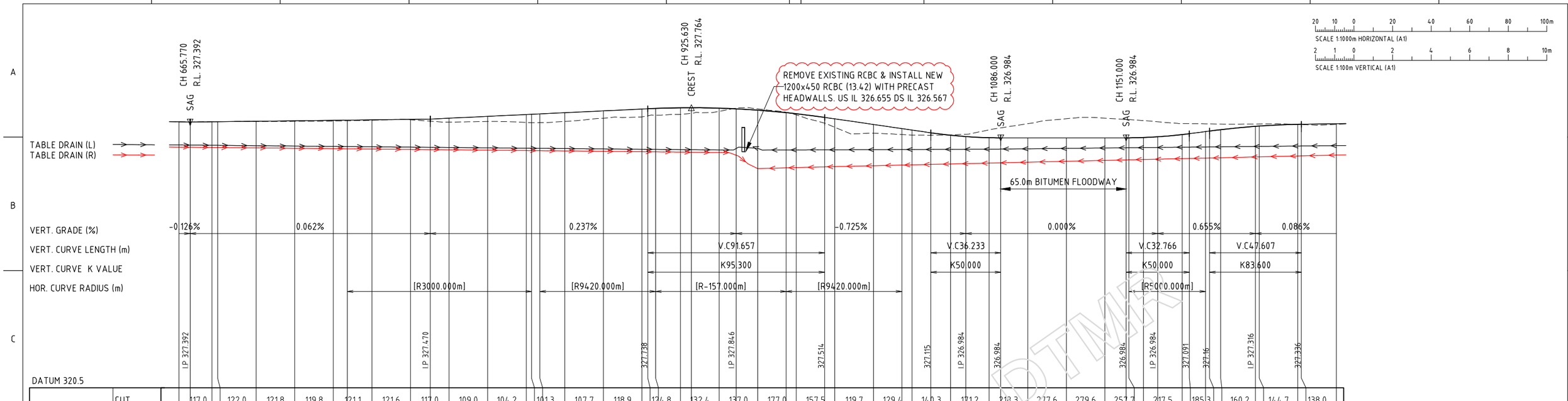
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 1 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00029

SCALE AS SHOWN

REV 0

A1



DATUM 320.5

EARTHWORKS	CUT		117.0	122.0	121.8	119.8	121.1	121.6	117.0	109.0	104.2	101.3	107.7	118.9	124.8	132.4	137.0	177.0	157.5	119.7	129.4	140.3	171.2	210.3	277.6	279.6	257.7	217.5	185.3	160.2	144.7	138.0
	FILL		2.6	3.2	2.9	3.6	3.9	4.8	5.5	9.4	19.9	35.8	59.1	87.4	111.4	111.5	125.4	101.6	101.5	72.6	40.5	15.6	4.7	2.2	1.4	1.9	1.9	1.2	1.3	1.4	1.2	1.1
GUIDE POSTS (L)			□				□				□				□	□	□	□	□					□			□		□			
GUIDE POSTS (R)			□				□				□				□	□	□	□	□			□		□			□		□			
DRAIN (R)		326.743	326.734	326.723	326.713	326.703	326.694	326.684	326.674	326.664	326.654	326.645	326.635	326.624	326.614	326.604	326.532	326.135	326.260	326.277	326.295	326.306	326.329	326.352	326.375	326.398	326.411	326.421	326.430	326.444	326.458	326.488	326.513	326.536
DRAIN (L)		326.799	326.791	326.780	326.771	326.762	326.752	326.743	326.738	326.734	326.724	326.715	326.705	326.696	326.688	326.679	326.670	326.708	326.678	326.681	326.684	326.686	326.687	326.690	326.700	326.710	326.720	326.726	326.730	326.741	326.747	326.760	326.772	326.782
SHOULDER (L)		327.265	327.264	327.279	327.291	327.304	327.316	327.329	327.335	327.358	327.406	327.453	327.464	327.451	327.431	327.439	327.429	327.412	327.182	327.128	327.070	327.039	327.030	327.037	327.051	327.051	327.051	327.051	327.029	327.037	327.075	327.147	327.200	327.217
SHOULDER (R)		327.265	327.264	327.279	327.291	327.304	327.316	327.329	327.335	327.378	327.474	327.521	327.696	327.847	328.010	328.087	328.077	328.060	327.479	327.317	327.159	327.063	327.004	326.938	326.916	326.916	326.916	326.916	326.894	326.933	327.011	327.147	327.200	327.217
EXISTING SURFACE LEVEL		327.398	327.404	327.411	327.412	327.419	327.427	327.439	327.453	327.416	327.392	327.410	327.409	327.491	327.526	327.591	327.671	327.756	327.735	327.646	327.052	327.059	327.075	326.916	326.916	327.350	327.479	327.494	327.460	327.355	327.347	327.343	327.332	327.334
DESIGN CL LEVEL		327.400	327.399	327.414	327.426	327.439	327.443	327.451	327.464	327.470	327.493	327.588	327.635	327.683	327.730	327.763	327.753	327.736	327.702	327.638	327.609	327.051	327.017	326.987	326.984	326.984	326.984	326.984	326.992	327.068	327.091	327.282	327.335	327.352
CHAINAGE		660.000	665.770	677.085	680.000	700.000	720.000	740.000	747.214	760.000	780.000	790.250	800.000	820.000	840.000	842.778	847.082	860.000	880.000	900.000	903.033	907.082	920.000	925.630	940.000	948.861	960.000	974.740	980.000	994.690	1000.000	1020.000	1034.740	1040.000	1049.767	1060.000	1067.884	1080.000	1086.000	1100.000	1120.000	1140.000	1151.000	1152.475	1160.000	1167.383	1180.000	1183.766	1192.146	1194.272	1200.000	1218.076	1220.000	1240.000	1241.879	1260.000
SUPERELEVATION			LHS and RHS -3%								LHS -3%				RHS6%						LHS-6%																	LHS1.5%	RHS -1.5%					RHS -3%				LHS and RHS -3%								
		660								790		845	848		910						970									1064		1090							1150		1171	1175			1215				1260								

LONGITUDINAL SECTION SECTION 1
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:50

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION
S00B01-ARW-CIV-LSN-00031	LONGITUDINAL SECTIONS SHEET 3 OF 7	2	06.05.22	ISSUED FOR CONSTRUCTION
S00B01-ARW-CIV-LSN-00029	LONGITUDINAL SECTIONS SHEET 1 OF 7	1	04.11.21	ISSUED FOR CONSTRUCTION
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	0	31.05.21	ISSUED FOR CONSTRUCTION
		A	16.03.21	ISSUED FOR REVIEW

RPEQ CERTIFICATION

ORIG	CHK'D	QA	APP'D
JAG	PRH	PML	PML
JAG	PRH	PML	PML
MVW	MJP	PML	PML
MVW	MJP	PML	PML

NR
NR

STATUS: FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

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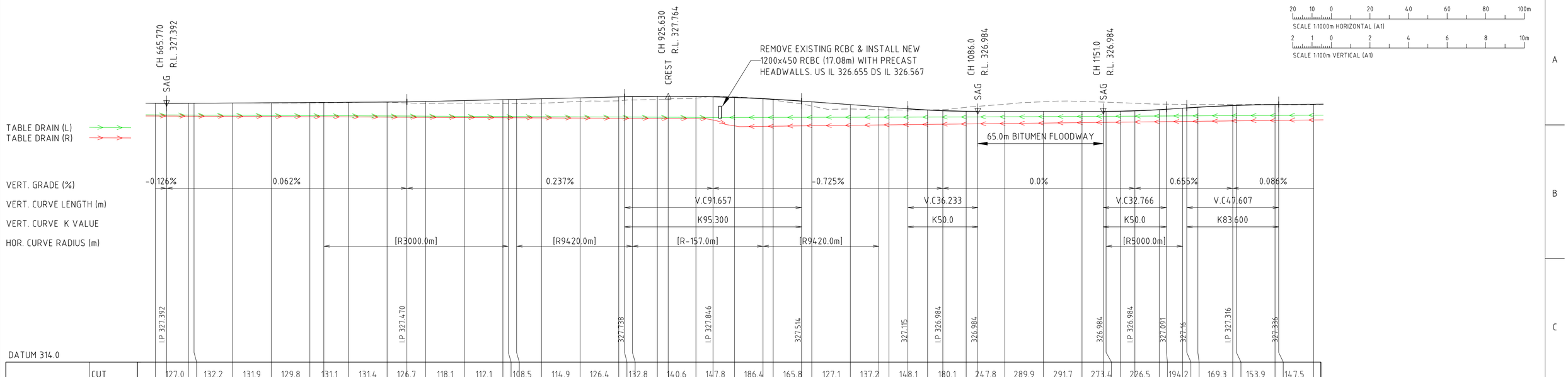
CONTRACTOR DWG No. 201237 C131

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED
DRAWING No. S00B01-ARW-CIV-LSN-00030

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 2 OF 7

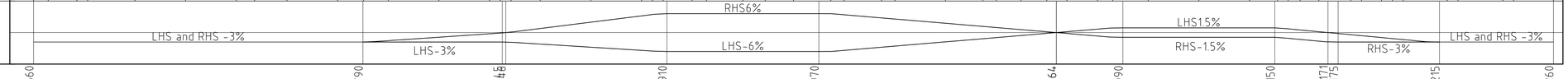
SCALE AS SHOWN | REV 2 | A1

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DATUM 314.0

EARTHWORKS	CUT		127.0	132.2	131.9	129.8	131.1	131.4	126.7	118.1	112.1	108.5	114.9	126.4	132.8	140.6	147.8	186.4	165.8	127.1	137.2	148.1	180.1	247.8	289.9	291.7	273.4	226.5	194.2	169.3	153.9	147.5
	FILL		2.1	2.7	2.4	3.0	3.2	4.0	4.5	8.1	17.5	32.7	55.7	83.9	108.0	108.4	122.3	99.2	98.7	69.4	38.0	14.3	4.1	1.2	1.0	1.3	2.8	1.2	1.3	1.4	1.2	1.1
GUIDE POSTS (L)			□				□				□				□	□	□	□				□		□			□			□		
GUIDE POSTS (R)			■				■				■				■	■	■	■				■		■			■			■		
DRAIN (R)		326.743	326.740	326.734	326.733	326.723	326.713	326.703	326.700	326.694	326.684	326.679	326.674	326.664	326.654	326.653	326.651	326.645	326.635	326.624	326.623	326.621	326.614	326.611	326.604	326.532	326.135	326.206	326.212	326.230	326.237	326.260	326.277	326.283	326.295	326.306	326.315	326.329	326.336	326.352	326.375	326.398	326.411	326.413	326.421	326.430	326.444	326.449	326.458	326.461	326.467	326.488	326.490	326.513	326.516	326.536
DRAIN (L)		326.799	326.796	326.791	326.790	326.780	326.771	326.762	326.758	326.752	326.743	326.738	326.734	326.724	326.715	326.713	326.711	326.705	326.696	326.688	326.686	326.685	326.679	326.677	326.670	326.667	326.666	326.669	326.670	326.673	326.674	326.678	326.681	326.682	326.684	326.686	326.687	326.690	326.692	326.700	326.710	326.720	326.726	326.727	326.730	326.734	326.741	326.743	326.747	326.748	326.751	326.760	326.761	326.772	326.772	326.782
SHOULDER (L)		327.265	327.257	327.264	327.266	327.279	327.291	327.304	327.308	327.316	327.329	327.335	327.358	327.406	327.453	327.460	327.470	327.464	327.451	327.431	327.428	327.422	327.439	327.440	327.429	327.412	327.378	327.314	327.307	327.270	327.252	327.182	327.128	327.107	327.070	327.039	327.030	327.037	327.051	327.051	327.051	327.051	327.051	327.046	327.029	327.023	327.037	327.048	327.075	327.081	327.098	327.147	327.154	327.200	327.201	327.217
SHOULDER (R)		327.265	327.257	327.264	327.266	327.279	327.291	327.304	327.308	327.316	327.329	327.335	327.378	327.474	327.571	327.584	327.605	327.696	327.847	328.010	328.036	328.070	328.087	328.088	328.077	328.060	328.026	327.962	327.912	327.758	327.699	327.479	327.317	327.262	327.159	327.063	327.004	326.938	326.916	326.916	326.916	326.916	326.916	326.911	326.894	326.888	326.933	326.936	327.011	327.025	327.060	327.147	327.154	327.200	327.201	327.217
EXISTING SURFACE LEVEL		327.398	327.392	327.404	327.405	327.411	327.412	327.419	327.427	327.439	327.453	327.416	327.392	327.410	327.383	327.377	327.378	327.409	327.491	327.526	327.553	327.569	327.591	327.612	327.671	327.756	327.735	327.646	327.580	327.367	327.257	327.104	327.069	327.054	327.052	327.059	327.075	327.191	327.243	327.350	327.479	327.494	327.460	327.456	327.430	327.401	327.355	327.353	327.347	327.345	327.341	327.343	327.344	327.332	327.328	327.334
DESIGN CL LEVEL		327.400	327.392	327.399	327.401	327.414	327.426	327.439	327.443	327.451	327.464	327.470	327.493	327.541	327.588	327.595	327.605	327.635	327.683	327.730	327.738	327.746	327.763	327.764	327.753	327.736	327.702	327.638	327.609	327.514	327.476	327.331	327.224	327.186	327.115	327.051	327.017	326.987	326.984	326.984	326.984	326.984	326.984	326.984	326.992	327.011	327.068	327.091	327.146	327.160	327.195	327.282	327.289	327.335	327.336	327.352
CHAINAGE		660.0	665.770	677.085	680.0	700.0	720.0	740.0	747.214	760.0	780.0	790.250	800.0	820.0	840.0	842.778	847.082	860.0	880.0	900.0	903.033	907.082	920.0	925.630	940.0	948.861	960.0	974.740	980.0	994.690	1000.0	1020.0	1034.740	1040.0	1049.767	1060.0	1067.884	1080.0	1086.0	1100.0	1120.0	1140.0	1151.0	1152.475	1160.0	1167.383	1180.0	1183.766	1192.146	1194.272	1200.0	1218.076	1220.0	1240.0	1241.879	1260.0



LONGITUDINAL SECTION - DAANDINE-NANDI ROAD SECTION 1 (2)
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LSN-00031	LONGITUDINAL SECTIONS SHEET 3 OF 7							
S00B01-ARW-CIV-LSN-00029	LONGITUDINAL SECTIONS SHEET 1 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION
NR

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STATUS: FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C131

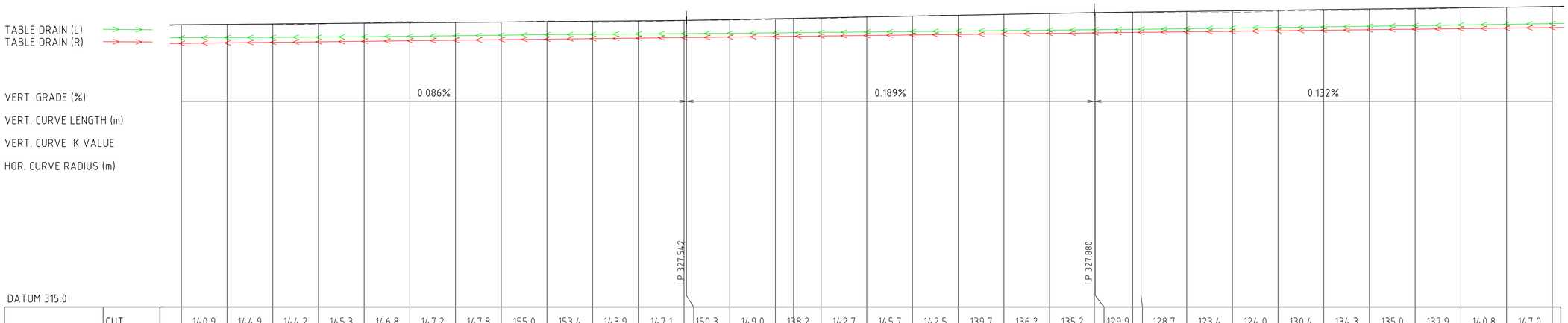
SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 2 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00030
SCALE AS SHOWN
REV 0
A1

SCALE 1:1000m HORIZONTAL (A1)

SCALE 1:100m VERTICAL (A1)



DATUM 315.0

EARTHWORKS	CUT		140.9	144.9	144.2	145.3	146.8	147.2	147.8	155.0	153.4	143.9	147.1	150.3	149.0	138.2	142.7	145.7	142.5	139.7	136.2	135.2	129.9	128.7	123.4	124.0	130.4	134.3	135.0	137.9	140.8	147.0
	FILL		1.6	3.0	2.8	1.8	1.7	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.4	2.3	3.2	3.6	3.3	3.0	4.5	5.5	6.1	7.0	6.3	4.7	3.3	2.6	3.5	5.8	3.9
GUIDE POSTS (L)							□							□		□							□								□	
GUIDE POSTS (R)							□							□		□							□								□	
DRAIN (R)		326.536	326.559	326.583	326.606	326.629	326.652	326.675	326.698	326.721	326.744	326.767	326.790	326.791	326.813	326.836	326.845	326.859	326.882	326.905	326.928	326.951	326.974	326.996	326.997	327.016	327.020	327.043	327.066	327.089	327.112	327.135	327.158	327.181	327.204	327.227
DRAIN (L)		326.782	326.792	326.802	326.813	326.826	326.849	326.872	326.896	326.919	326.934	326.949	326.964	326.965	326.982	327.0	327.007	327.018	327.037	327.057	327.076	327.096	327.116	327.135	327.136	327.152	327.156	327.176	327.204	327.231	327.258	327.286	327.313	327.340	327.371	327.403
SHOULDER (L)		327.217	327.234	327.251	327.268	327.286	327.303	327.320	327.337	327.354	327.371	327.389	327.406	327.407	327.443	327.480	327.496	327.518	327.556	327.594	327.632	327.670	327.708	327.745	327.745	327.767	327.772	327.798	327.825	327.851	327.878	327.904	327.930	327.957	327.983	328.010
SHOULDER (R)		327.217	327.234	327.251	327.268	327.286	327.303	327.320	327.337	327.354	327.371	327.389	327.406	327.407	327.443	327.480	327.496	327.518	327.556	327.594	327.632	327.670	327.708	327.745	327.745	327.767	327.772	327.798	327.825	327.851	327.878	327.904	327.930	327.957	327.983	328.010
EXISTING SURFACE LEVEL		327.334	327.368	327.379	327.385	327.431	327.485	327.468	327.464	327.522	327.462	327.488	327.533	327.536	327.553	327.582	327.596	327.626	327.689	327.740	327.773	327.804	327.851	327.888	327.888	327.912	327.907	327.874	327.885	327.948	327.967	327.989	328.026	328.087	328.118	328.157
DESIGN CL LEVEL		327.352	327.369	327.386	327.403	327.421	327.438	327.455	327.472	327.489	327.506	327.524	327.541	327.542	327.578	327.615	327.631	327.653	327.691	327.729	327.767	327.805	327.843	327.880	327.880	327.902	327.907	327.933	327.960	327.986	328.013	328.039	328.065	328.092	328.118	328.145
CHAINAGE		1260.0	1280.0	1300.0	1320.0	1340.0	1360.0	1380.0	1400.0	1420.0	1440.0	1460.0	1480.0	1481.082	1500.0	1520.0	1527.950	1540.0	1560.0	1580.0	1600.0	1620.0	1640.0	1659.555	1660.0	1676.366	1680.0	1700.0	1720.0	1740.0	1760.0	1780.0	1800.0	1820.0	1840.0	1860.0
SUPERELEVATION																																				

LHS and RHS -3%

1260 1860

LONGITUDINAL SECTION - DAANDINE-NANDI ROAD SECTION 1 (3)
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LSN-00032	LONGITUDINAL SECTIONS SHEET 4 OF 7							
S00B01-ARW-CIV-LSN-00030	LONGITUDINAL SECTIONS SHEET 2 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

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PLANT B01
SECURITY CLASSIFICATION RESTRICTED

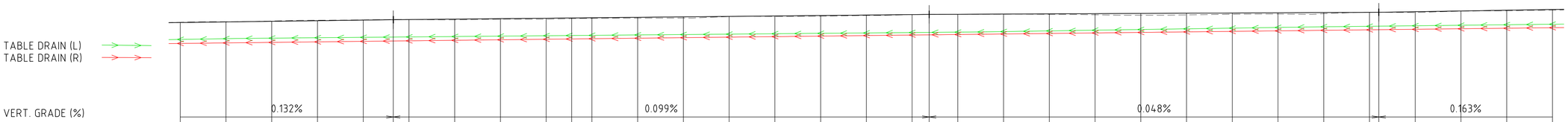
STATUS FOR CONSTRUCTION
CONTRACTOR DWG No. 201237 C132

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 3 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00031
SCALE AS SHOWN
REV 0 A1

SCALE 1:1000m HORIZONTAL (A1)

SCALE 1:100m VERTICAL (A1)



VERT. GRADE (%)

VERT. CURVE LENGTH (m)

VERT. CURVE K VALUE

HOR. CURVE RADIUS (m)

DATUM 315.0

EARTHWORKS	CUT		148.6	144.8	150.8	151.6	147.2	142.6	140.6	141.0	138.0	143.4	138.6	136.7	140.5	141.5	143.5	148.6	150.3	142.6	139.9	136.4	130.9	124.9	124.7	126.8	131.3	141.5	143.3	140.4	140.2	138.7
	FILL		2.3	3.6	2.3	1.8	2.7	3.6	3.2	3.5	2.9	2.3	1.9	1.9	1.7	1.9	2.3	2.8	3.5	4.2	3.1	3.3	3.9	3.8	2.6	2.2	1.7	1.4	1.2	1.5	1.3	1.2
GUIDE POSTS (L)								□			□								□							□						
GUIDE POSTS (R)								□			□								□							□						
DRAIN (R)		327.227	327.250	327.273	327.296	327.319	327.334	327.342	327.365	327.388	327.411	327.424	327.434	327.457	327.480	327.503	327.526	327.549	327.572	327.595	327.604	327.618	327.641	327.664	327.687	327.710	327.733	327.756	327.780	327.803	327.826	327.849	327.872	327.895	327.918
DRAIN (L)		327.403	327.435	327.460	327.477	327.495	327.506	327.512	327.530	327.548	327.565	327.575	327.583	327.600	327.618	327.635	327.653	327.670	327.688	327.705	327.712	327.723	327.748	327.778	327.808	327.838	327.869	327.899	327.929	327.957	327.980	328.002	328.025	328.047	328.070
SHOULDER (L)		328.010	328.036	328.063	328.089	328.115	328.133	328.139	328.159	328.179	328.199	328.210	328.219	328.239	328.258	328.278	328.298	328.318	328.338	328.357	328.365	328.371	328.380	328.390	328.399	328.409	328.418	328.428	328.437	328.447	328.456	328.484	328.517	328.549	328.582
SHOULDER (R)		328.010	328.036	328.063	328.089	328.115	328.133	328.139	328.159	328.179	328.199	328.210	328.219	328.239	328.258	328.278	328.298	328.318	328.338	328.357	328.365	328.371	328.380	328.390	328.399	328.409	328.418	328.428	328.437	328.447	328.456	328.484	328.517	328.549	328.582
EXISTING SURFACE LEVEL		328.157	328.182	328.212	328.246	328.262	328.279	328.275	328.264	328.290	328.292	328.316	328.326	328.337	328.341	328.406	328.411	328.425	328.453	328.491	328.504	328.505	328.507	328.504	328.485	328.467	328.481	328.509	328.519	328.532	328.593	328.583	328.644	328.664	328.689
DESIGN CL LEVEL		328.145	328.171	328.198	328.224	328.250	328.268	328.274	328.294	328.314	328.334	328.345	328.354	328.374	328.393	328.413	328.433	328.453	328.473	328.492	328.500	328.506	328.515	328.525	328.534	328.544	328.553	328.563	328.572	328.582	328.591	328.619	328.652	328.684	328.717
CHAINAGE		1860.0	1880.0	1900.0	1920.0	1940.0	1953.145	1960.0	1980.0	2000.0	2020.0	2031.145	2040.0	2060.0	2080.0	2100.0	2120.0	2140.0	2160.0	2180.0	2187.469	2200.0	2220.0	2240.0	2260.0	2280.0	2300.0	2320.0	2340.0	2360.0	2380.0	2400.0	2420.0	2440.0	2460.0
SUPERELEVATION		LHS and RHS -3%																																	

1860 2460

LONGITUDINAL SECTION - DAANDINE-NANDI ROAD SECTION 1 (4)
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LSN-00033	LONGITUDINAL SECTIONS SHEET 5 OF 7							
S00B01-ARW-CIV-LSN-00031	LONGITUDINAL SECTIONS SHEET 3 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C133

SITE S00

PLANT B01

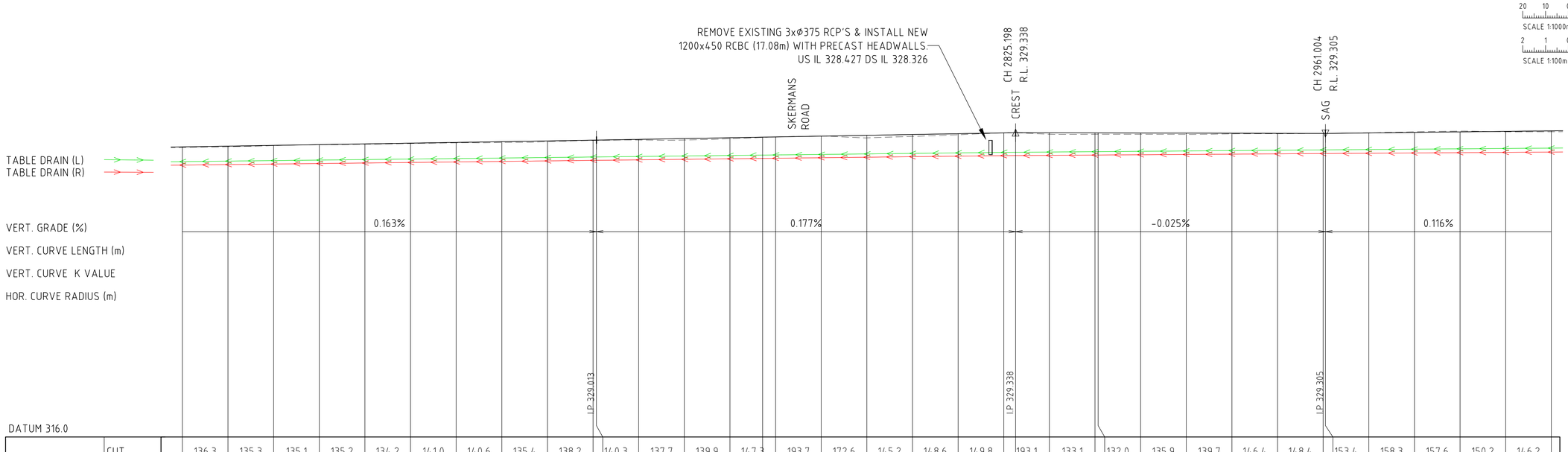
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 4 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00032

SCALE AS SHOWN

REV 0 A1



DATUM 316.0

EARTHWORKS	CUT		136.3	135.3	135.1	135.2	134.2	141.0	140.6	135.4	138.2	140.3	137.7	139.9	147.3	193.7	172.6	145.2	148.6	149.8	193.1	133.1	132.0	135.9	139.7	146.4	148.4	153.4	158.3	157.6	150.2	146.2
	FILL		1.3	1.2	1.4	1.6	1.8	1.7	1.1	1.3	1.6	1.6	1.6	1.4	1.8	1.2	2.9	4.6	4.7	8.7	6.0	10.0	9.3	9.4	8.0	7.0	5.8	4.7	4.3	5.0	5.3	4.9
GUIDE POSTS (L)			□				□				□				□					□			□							□		
GUIDE POSTS (R)			□				□				□				□					□			□							□		
DRAIN (R)		327.918	327.941	327.964	327.987	328.010	328.033	328.056	328.079	328.102	328.125	328.126	328.148	328.171	328.194	328.210	328.217	328.240	328.263	328.286	328.309	328.332	328.335	328.345	328.358	328.359	328.371	328.384	328.397	328.410	328.424	328.424	328.437	328.450	328.463	328.476	328.489
DRAIN (L)		328.070	328.092	328.115	328.137	328.160	328.182	328.205	328.227	328.250	328.273	328.274	328.295	328.318	328.340	328.356	328.363	328.385	328.408	328.430	328.453	328.475	328.479	328.491	328.506	328.507	328.522	328.537	328.553	328.569	328.584	328.585	328.600	328.615	328.631	328.647	328.662
SHOULDER (L)		328.582	328.615	328.647	328.680	328.712	328.745	328.778	328.810	328.843	328.875	328.878	328.911	328.946	328.981	329.007	329.017	329.052	329.088	329.123	329.159	329.194	329.203	329.200	329.195	329.194	329.190	329.185	329.180	329.175	329.170	329.170	329.192	329.215	329.238	329.262	329.285
SHOULDER (R)		328.582	328.615	328.647	328.680	328.712	328.745	328.778	328.810	328.843	328.875	328.878	328.911	328.946	328.981	329.007	329.017	329.052	329.088	329.123	329.159	329.194	329.203	329.200	329.195	329.194	329.190	329.185	329.180	329.175	329.170	329.170	329.192	329.215	329.238	329.262	329.285
EXISTING SURFACE LEVEL		328.689	328.725	328.772	328.806	328.832	328.865	328.893	328.909	328.948	328.998	329.0	329.015	329.019	329.077	329.132	329.152	329.188	329.110	329.174	329.247	329.335	329.333	329.274	329.271	329.272	329.267	329.262	329.285	329.290	329.304	329.305	329.334	329.379	329.409	329.381	329.379
DESIGN CL LEVEL		328.717	328.750	328.782	328.815	328.847	328.880	328.913	328.945	328.978	329.010	329.013	329.046	329.081	329.116	329.142	329.152	329.187	329.223	329.258	329.294	329.329	329.338	329.335	329.330	329.329	329.325	329.320	329.315	329.310	329.305	329.305	329.327	329.350	329.373	329.397	329.420
CHAINAGE		2460.0	2480.0	2500.0	2520.0	2540.0	2560.0	2580.0	2600.0	2620.0	2640.0	2641.464	2660.0	2680.0	2700.0	2714.300	2720.0	2740.0	2760.0	2780.0	2800.0	2820.0	2825.198	2840.0	2860.0	2861.373	2880.0	2900.0	2920.0	2940.0	2960.0	2961.004	2980.0	3000.0	3020.0	3040.0	3060.0
SUPERELEVATION		LHS and RHS -3%																																			

2460 — 3060

LONGITUDINAL SECTION - DAANDINE-NANDI ROAD SECTION 1 (5)
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LSN-00034	LONGITUDINAL SECTIONS SHEET 6 OF 7							
S00B01-ARW-CIV-LSN-00032	LONGITUDINAL SECTIONS SHEET 4 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION NR

STATUS: FOR CONSTRUCTION

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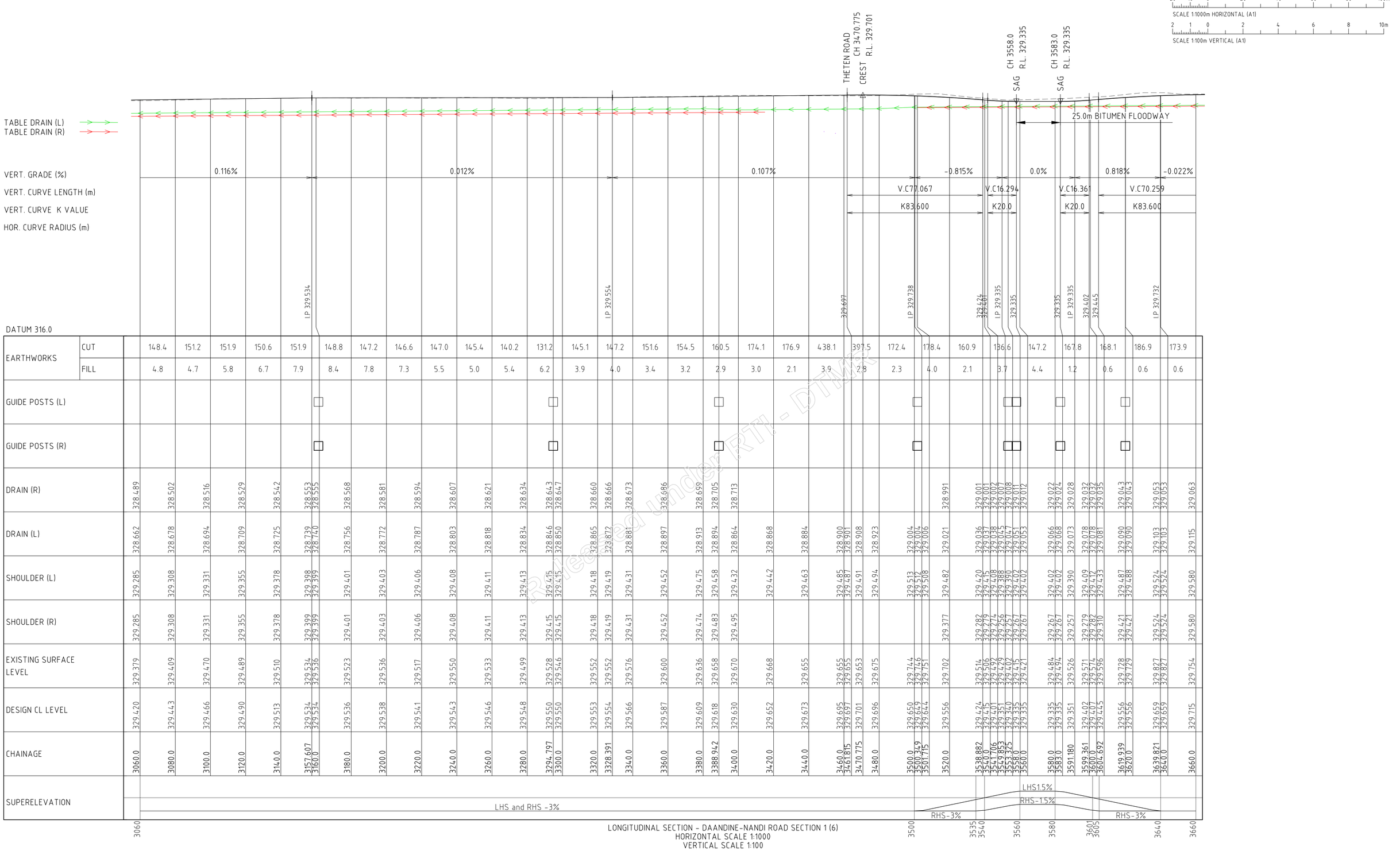
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SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED
DRAWING No. S00B01-ARW-CIV-LSN-00033

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 5 OF 7

SCALE AS SHOWN | REV 0 | A1



EARTHWORKS	CUT		148.4	151.2	151.9	150.6	151.9	148.8	147.2	146.6	147.0	145.4	140.2	131.2	145.1	147.2	151.6	154.5	160.5	174.1	176.9	438.1	397.5	172.4	178.4	160.9	186.6	147.2	167.8	168.1	186.9	173.9
	FILL		4.8	4.7	5.8	6.7	7.9	8.4	7.8	7.3	5.5	5.0	5.4	6.2	3.9	4.0	3.4	3.2	2.9	3.0	2.1	3.9	2.8	2.3	4.0	2.1	3.7	4.4	1.2	0.6	0.6	0.6
GUIDE POSTS (L)																																
GUIDE POSTS (R)																																
DRAIN (R)		328.489	328.502	328.516	328.529	328.542	328.553	328.555	328.568	328.581	328.594	328.607	328.621	328.634	328.643	328.647	328.660	328.666	328.673	328.686	328.699	328.705	328.713				328.991		329.001	329.001	329.002	329.007
DRAIN (L)		328.662	328.678	328.694	328.709	328.725	328.739	328.740	328.756	328.772	328.787	328.803	328.818	328.834	328.846	328.850	328.865	328.872	328.881	328.897	328.913	328.894	328.864	328.868	328.884		329.021	329.036	329.037	329.038	329.045	329.047
SHOULDER (L)		329.285	329.308	329.331	329.355	329.378	329.398	329.399	329.401	329.403	329.406	329.408	329.411	329.413	329.415	329.415	329.418	329.419	329.431	329.452	329.475	329.458	329.432	329.442	329.463	329.485	329.482	329.420	329.415	329.408	329.388	329.390
SHOULDER (R)		329.285	329.308	329.331	329.355	329.378	329.399	329.399	329.401	329.403	329.406	329.408	329.411	329.413	329.415	329.415	329.418	329.419	329.431	329.452	329.474	329.483	329.495			329.487	329.377	329.282	329.279	329.274	329.256	329.257
EXISTING SURFACE LEVEL		329.379	329.409	329.470	329.489	329.510	329.534	329.536	329.523	329.536	329.517	329.550	329.533	329.499	329.528	329.546	329.552	329.552	329.576	329.600	329.636	329.658	329.670	329.668	329.655	329.655	329.702	329.514	329.506	329.492	329.429	329.402
DESIGN CL LEVEL		329.420	329.443	329.466	329.490	329.513	329.534	329.534	329.536	329.538	329.541	329.543	329.546	329.548	329.550	329.550	329.553	329.554	329.566	329.587	329.609	329.618	329.630	329.652	329.673	329.695	329.556	329.424	329.415	329.401	329.351	329.340
CHAINAGE		3060.0	3080.0	3100.0	3120.0	3140.0	3157.607	3160.0	3180.0	3200.0	3220.0	3240.0	3260.0	3280.0	3294.797	3300.0	3320.0	3328.391	3340.0	3360.0	3380.0	3388.942	3400.0	3420.0	3440.0	3460.0	3520.0	3538.882	3540.0	3541.706	3549.853	3553.325
SUPERELEVATION																																

LONGITUDINAL SECTION - DAANDINE-NANDI ROAD SECTION 1 (6)
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LSN-00035	LONGITUDINAL SECTIONS SHEET 7 OF 7							
S00B01-ARW-CIV-LSN-00033	LONGITUDINAL SECTIONS SHEET 5 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

brandon & associates ENGINEERING CONSULTANTS personal professional practical

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C135

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 6 OF 7

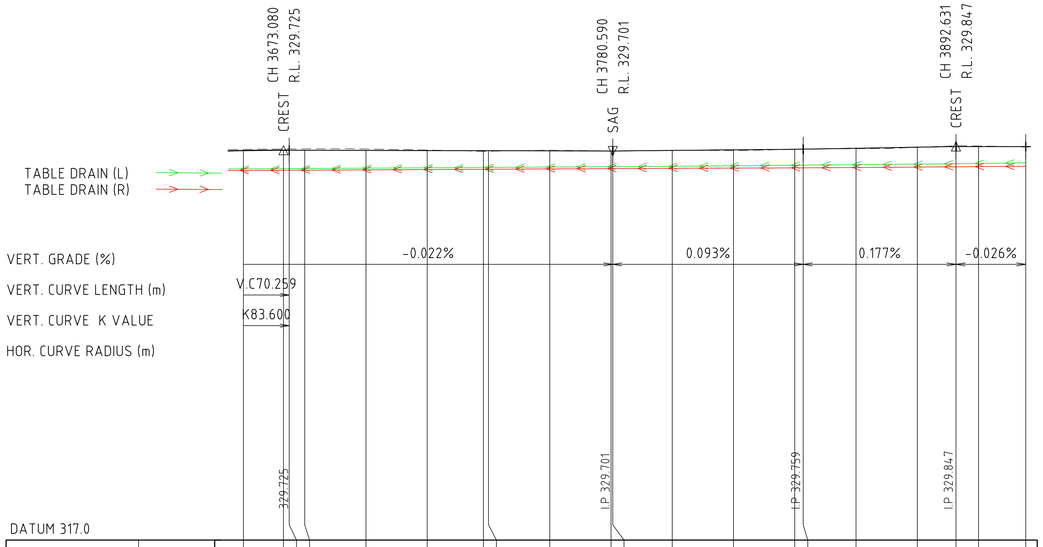
DRAWING No. S00B01-ARW-CIV-LSN-00034

SCALE AS SHOWN

REV 0 A1

SCALE 1:1000m HORIZONTAL (A1)

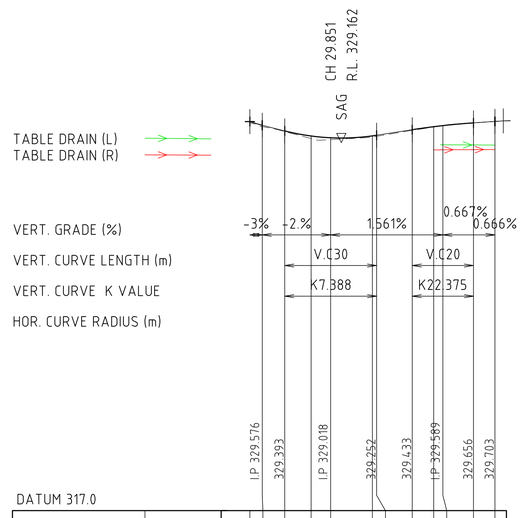
SCALE 1:100m VERTICAL (A1)



DATUM 317.0

EARTHWORKS	CUT		161.4	164.5	163.6	153.8	157.3	151.8	146.5	145.1	144.3	143.5	141.7	142.8	107.0
	FILL		0.6	0.6	0.6	0.6	0.6	0.8	1.2	1.0	0.7	1.2	1.4	1.3	1.1
GUIDE POSTS (L)						□								□	
GUIDE POSTS (R)						□								□	
DRAIN (R)		329.063	329.070	329.084	329.094	329.103	329.115	329.125	329.135	329.142	329.149	329.161	329.176	329.185	
			329.073			329.104		329.125			329.150			329.190	
DRAIN (L)		329.115	329.123	329.139	329.151	329.163	329.176	329.188	329.200	329.218	329.236	329.254	329.272	329.285	
			329.127			329.164		329.188			329.238			329.295	
SHOULDER (L)		329.580	329.590	329.584	329.580	329.575	329.571	329.566	329.584	329.603	329.621	329.654	329.690	329.712	
			329.590			329.575		329.566			329.624			329.710	
SHOULDER (R)		329.580	329.590	329.584	329.580	329.575	329.571	329.566	329.584	329.603	329.621	329.654	329.690	329.712	
			329.589			329.575		329.566			329.624			329.710	
EXISTING SURFACE LEVEL		329.754	329.766	329.767	329.732	329.689	329.723	329.702	329.718	329.719	329.754	329.775	329.820	329.868	
			329.769			329.692		329.701			329.759			329.863	329.841
DESIGN CL LEVEL		329.715	329.725	329.719	329.715	329.710	329.706	329.701	329.719	329.738	329.756	329.789	329.825	329.847	
			329.724			329.710		329.701			329.759			329.845	329.841
CHAINAGE		3660.0	3673.080	3700.0	3720.0	3738.337	3760.0	3780.0	3800.0	3820.0	3842.0	3860.0	3880.0	3892.631	
			3674.950			3740.0		3780.590			3842.756			3900.0	3915.400
			3680.0												
SUPERELEVATION															
			LHS and RHS -3%												

LONGITUDINAL SECTION - DAANDINE-NANDI ROAD SECTION 1 (7)
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100



DATUM 317.0

EARTHWORKS	CUT												21.8	98.6
	FILL													11.6
GUIDE POSTS (L)		REFER DWG S00B01-ARW-CIV-LAY-0055 FOR GUIDE POST DETAIL & SETOUT TABLE												
GUIDE POSTS (R)														
DRAIN (R)													328.774	328.783
													328.776	
DRAIN (L)													328.941	328.935
SHOULDER (L)													329.420	329.550
													329.464	
SHOULDER (R)													329.420	329.512
													329.448	
EXISTING SURFACE LEVEL		329.655						329.192					329.520	329.657
		329.534						329.216	329.413				329.567	
DESIGN CL LEVEL			329.576	329.393		329.228		329.232	329.433				329.532	329.656
				329.372		329.146		329.252					329.567	329.703
						329.109								
CHAINAGE		0.000						40.000	53.008				60.000	73.008
		4.049			11.381		20.000	41.381					63.008	80.000
							26.381							
SUPERELEVATION														

LONGITUDINAL SECTION THETEN ROAD
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LSN-00034	LONGITUDINAL SECTIONS SHEET 6 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION NR

STATUS: FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

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CONTRACTOR DWG No. 201237 C136

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

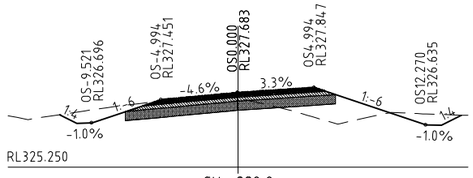
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 7 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00035

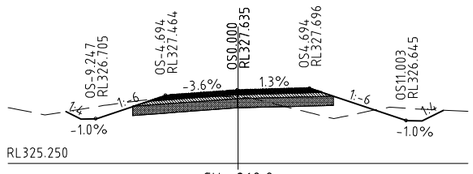
SCALE AS SHOWN | REV 0 | A1

SCALE 1:200m (A1) (HOR)

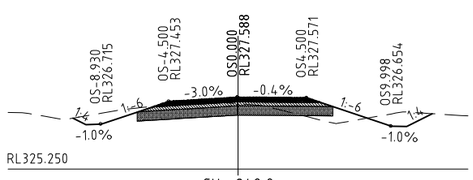
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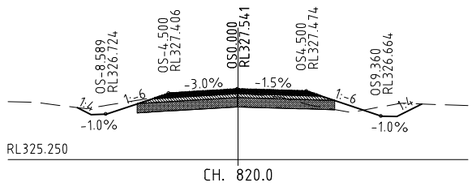
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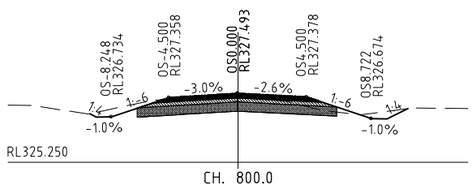
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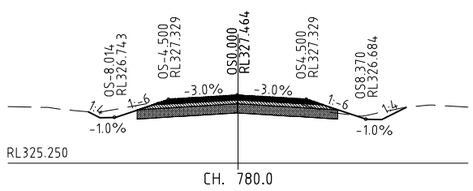
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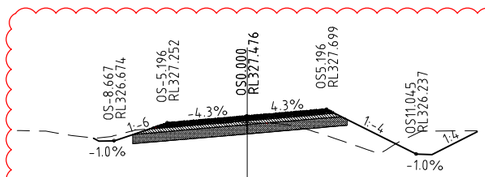
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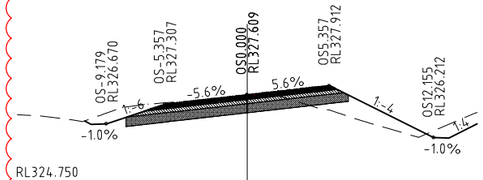
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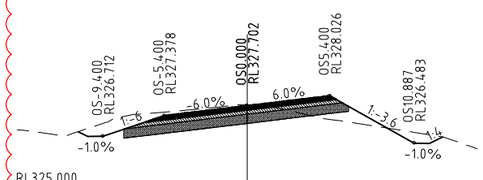
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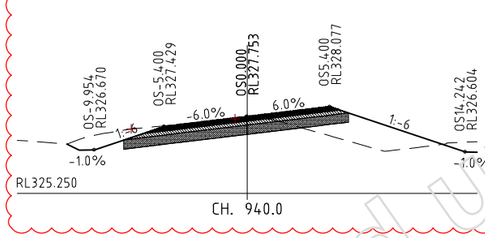
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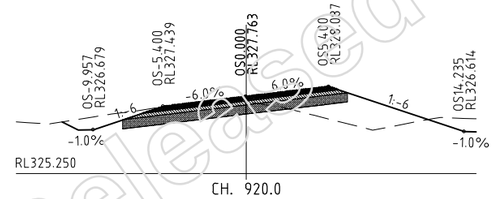
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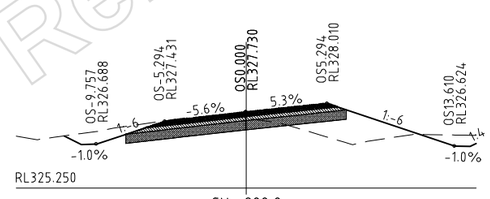
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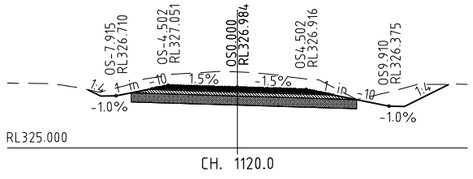
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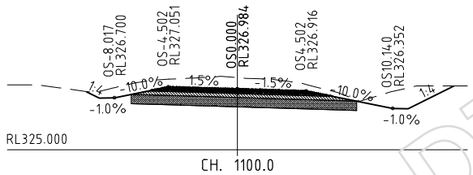
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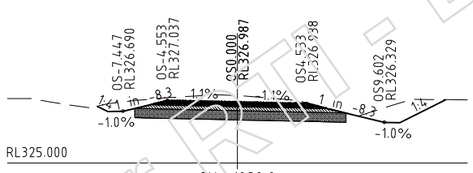
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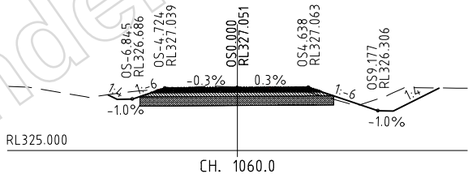
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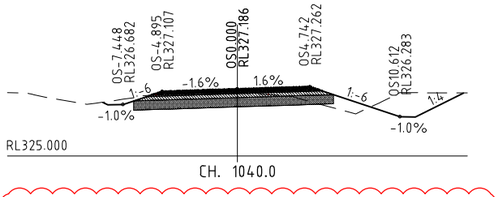
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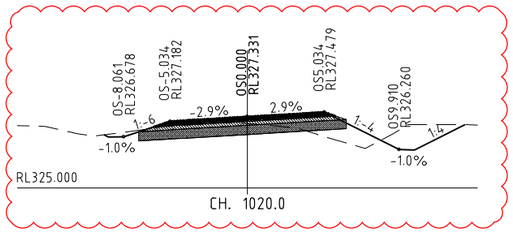
CH. 1080.0



CH. 1060.0



CH. 1040.0



CH. 1020.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

NR

RPEQ CERTIFICATION

NR

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C142

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 3 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00036

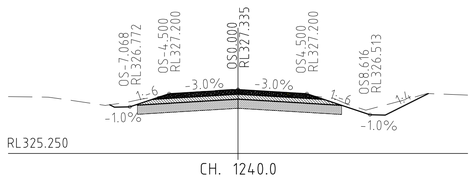
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REV 2

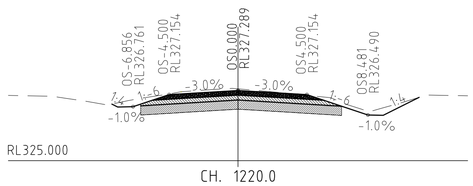
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SCALE 1:200m (A1)(HOR)

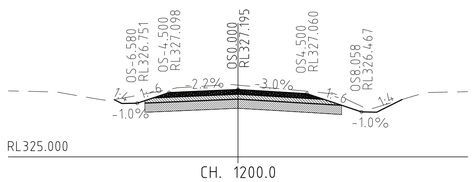
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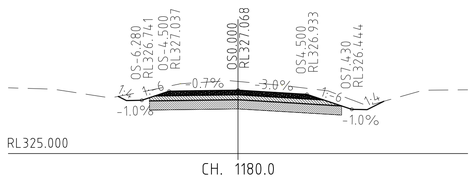
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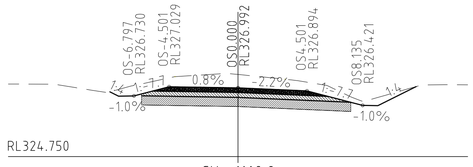
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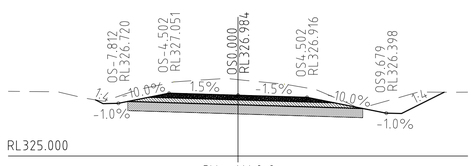
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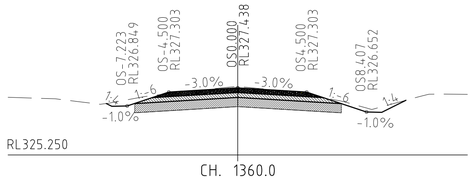
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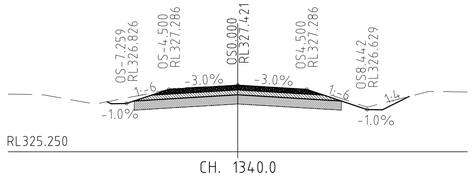
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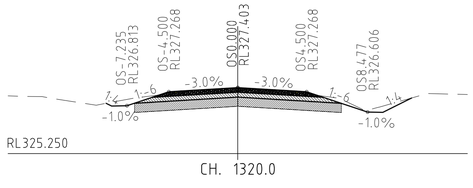
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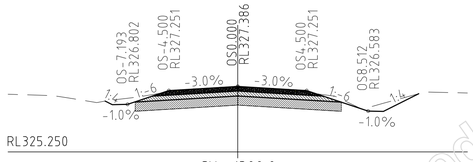
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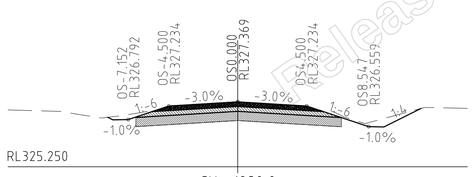
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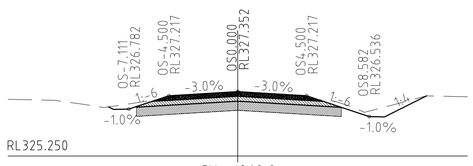
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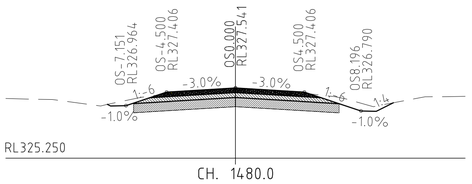
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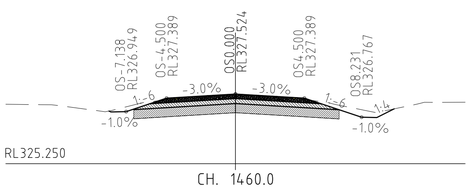
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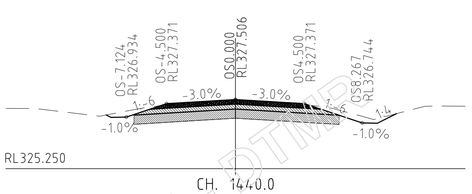
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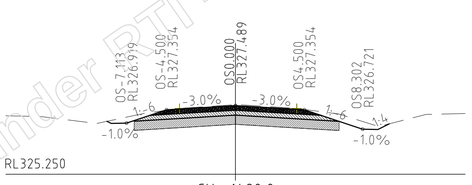
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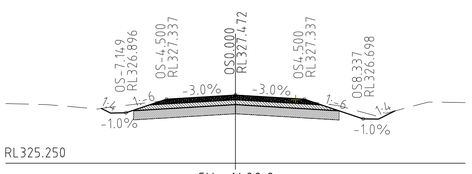
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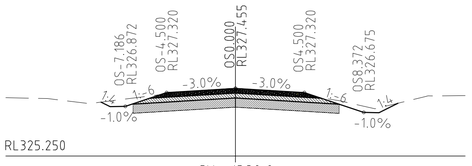
CH. 1440.0



CH. 1420.0



CH. 1400.0



CH. 1380.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11							
S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

STATUS FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C143

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

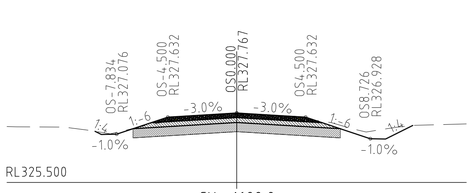
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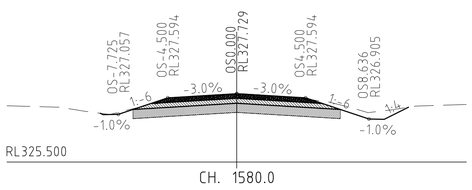
REV 0 | A1

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 4 OF 11

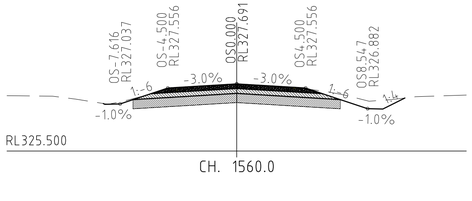
Released under PTI - PTNR



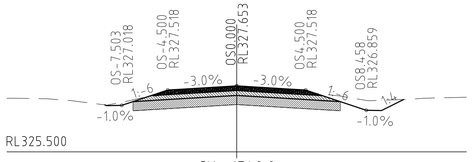
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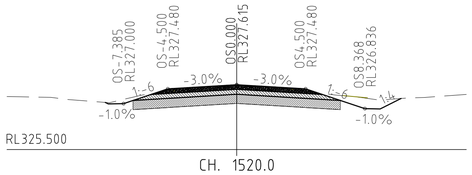
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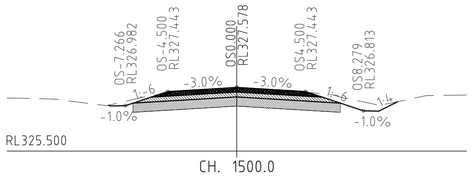
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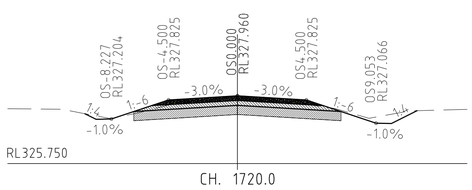
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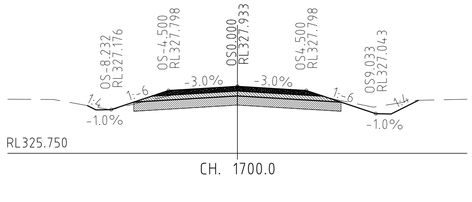
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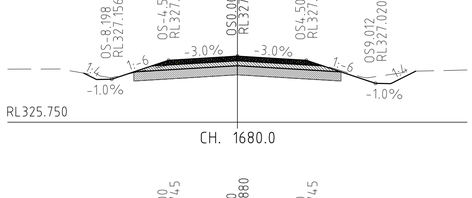
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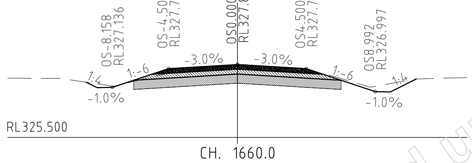
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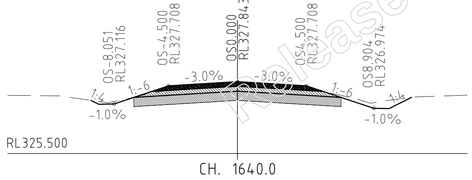
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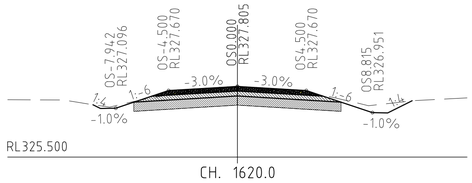
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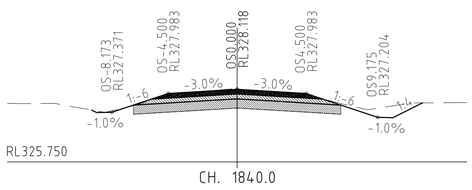
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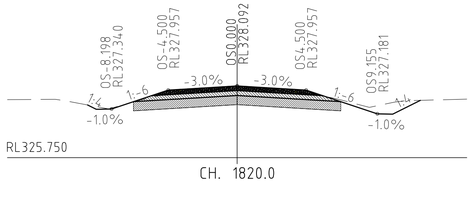
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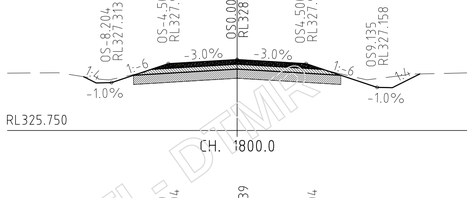
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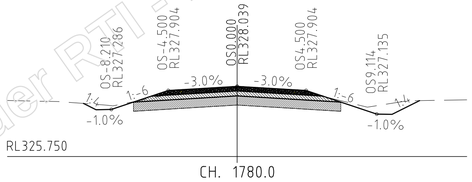
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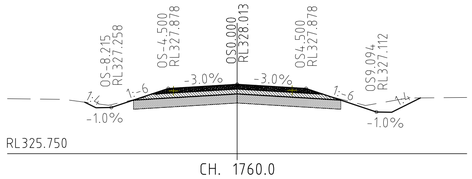
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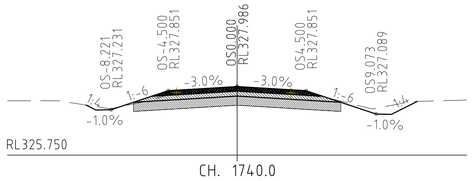
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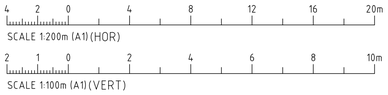
CH. 1780.0



CH. 1760.0



CH. 1740.0



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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00039	CROSS SECTIONS SHEET 6 OF 11							
S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

STATUS: FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

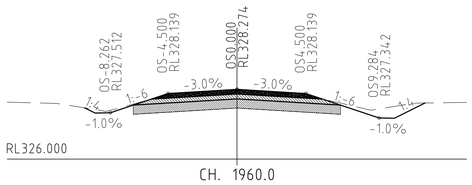
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SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

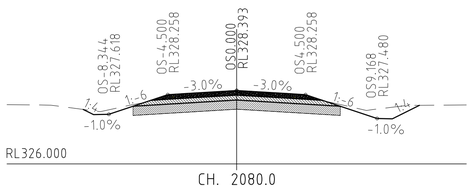
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DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 5 OF 11

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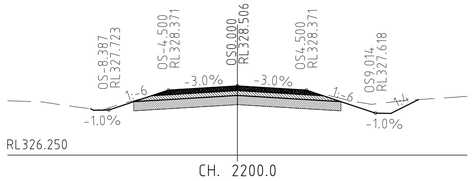
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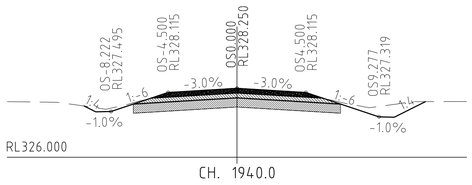
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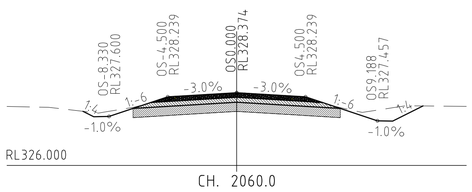
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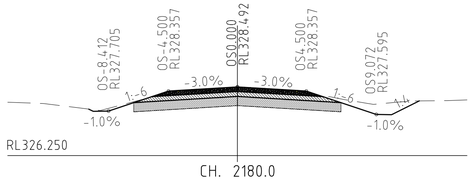
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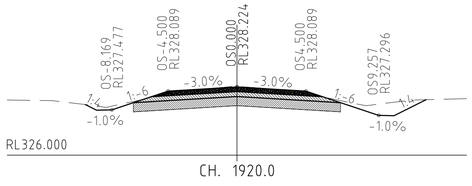
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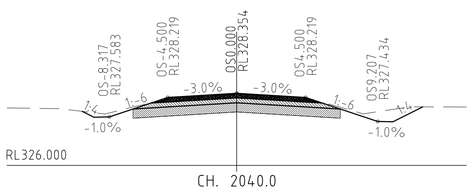
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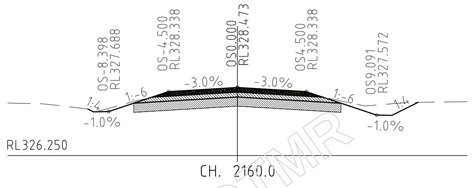
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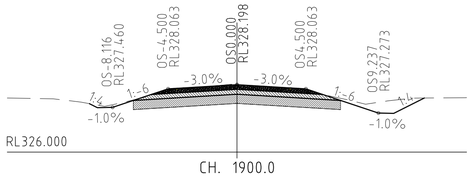
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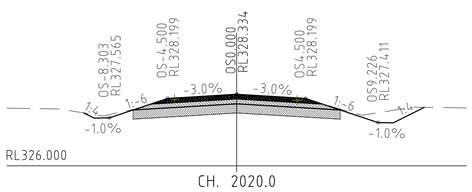
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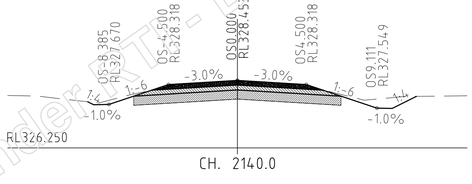
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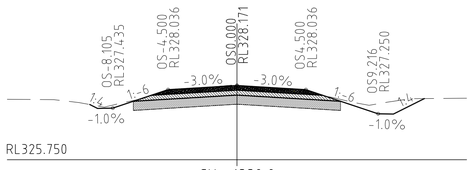
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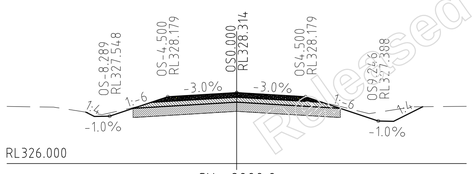
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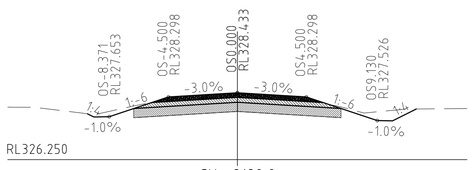
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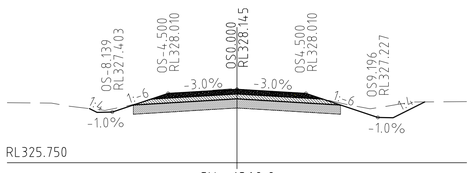
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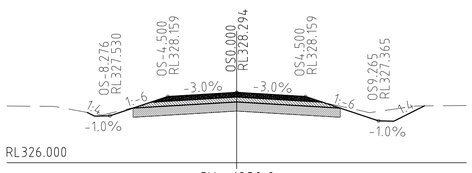
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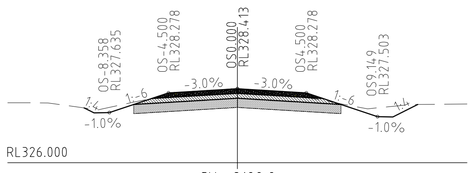
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CH. 2100.0

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SCALE 1:200m (A1) (HOR)

SCALE 1:100m (A1) (VERT)

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S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal.professional.practical

arrow energy go further

STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C145

SITE S00

PLANT B01

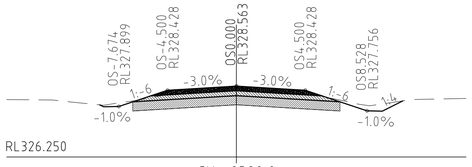
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SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 6 OF 11

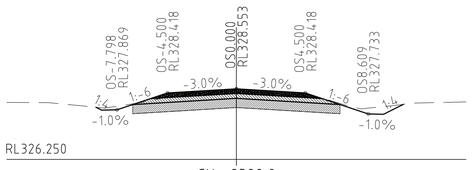
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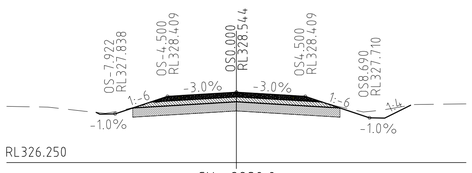
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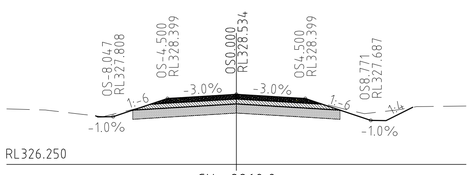
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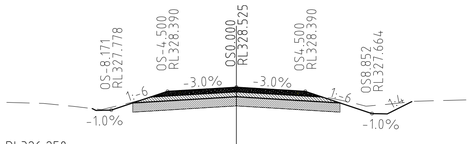
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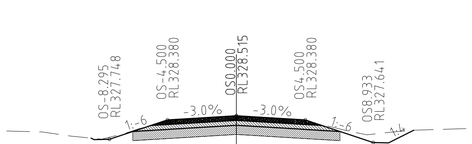
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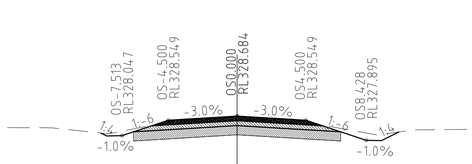
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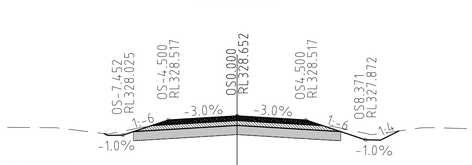
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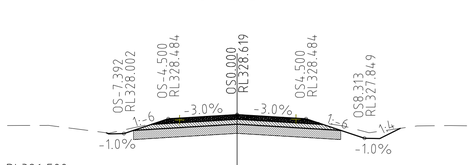
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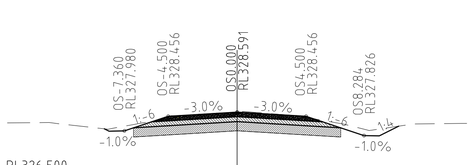
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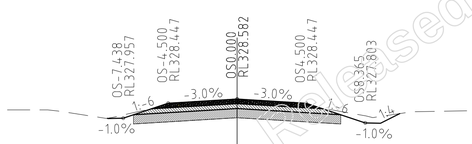
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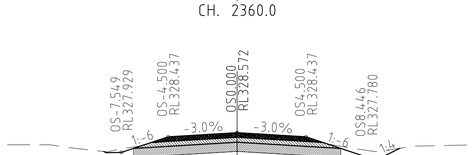
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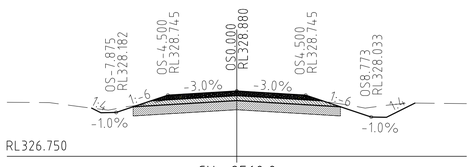
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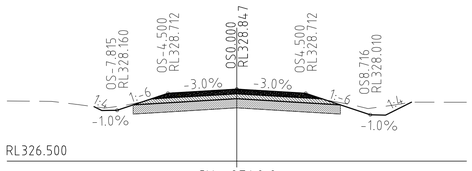
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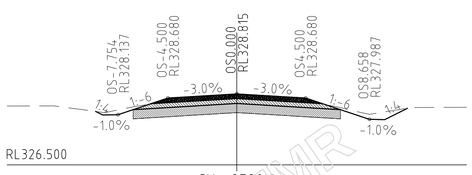
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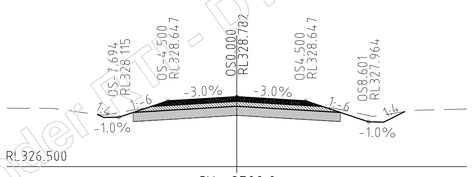
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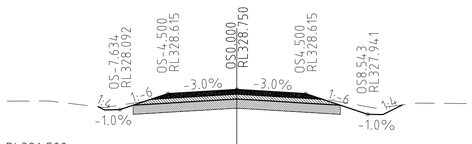
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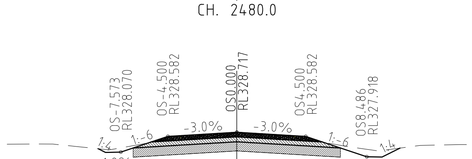
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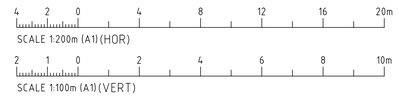
CH. 2500.0



CH. 2480.0



CH. 2460.0



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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00041	CROSS SECTIONS SHEET 8 OF 11							
S00B01-ARW-CIV-CRS-00039	CROSS SECTIONS SHEET 6 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C146

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

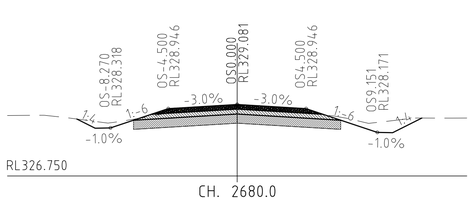
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 7 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00040

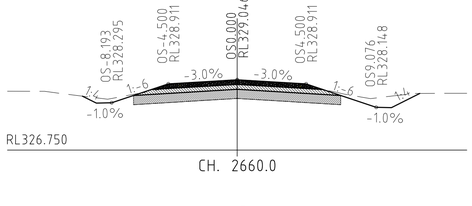
SCALE AS SHOWN

REV 0

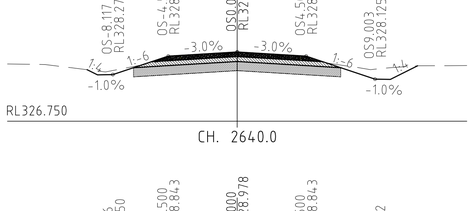
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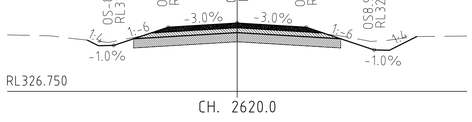
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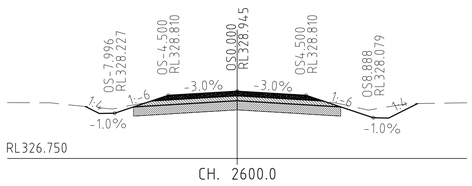
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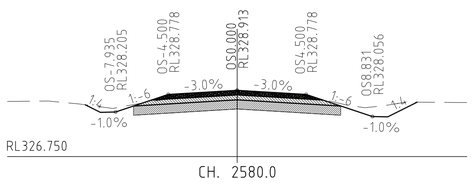
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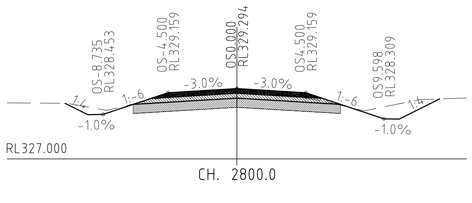
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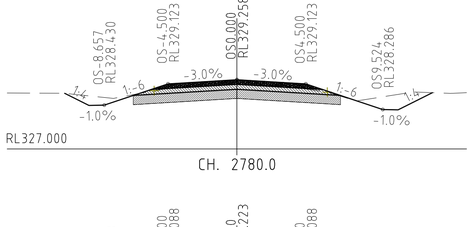
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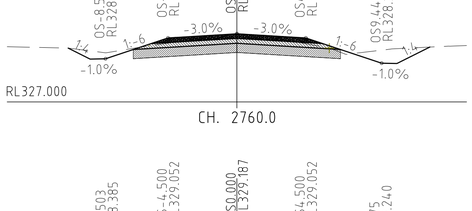
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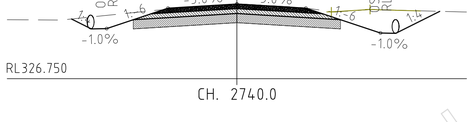
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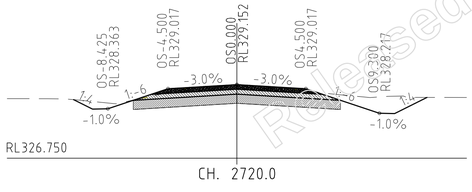
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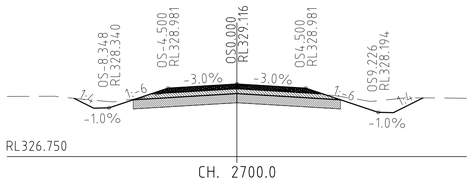
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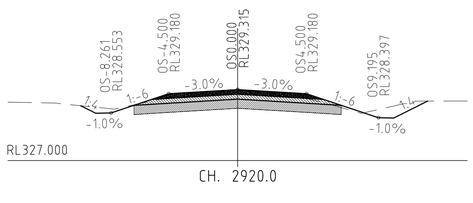
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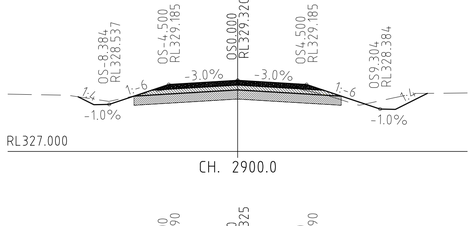
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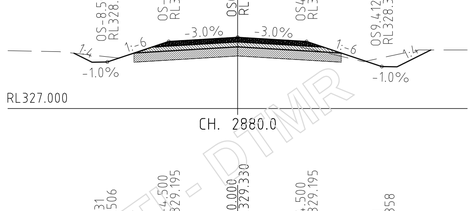
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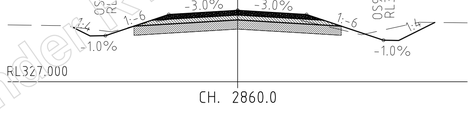
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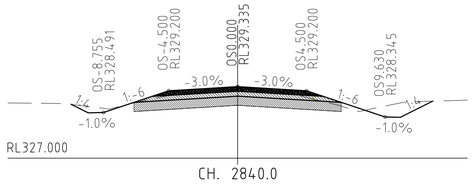
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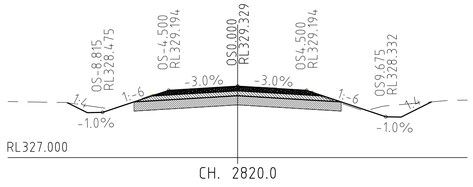
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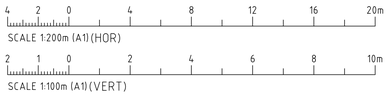
CH. 2860.0



CH. 2840.0



CH. 2820.0



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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00042	CROSS SECTIONS SHEET 9 OF 11							
S00B01-ARW-CIV-CRS-00040	CROSS SECTIONS SHEET 7 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C147

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

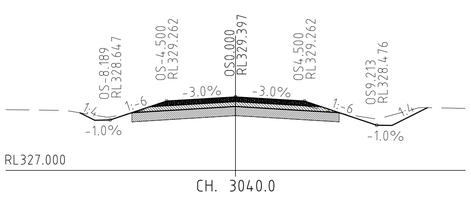
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 8 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00041

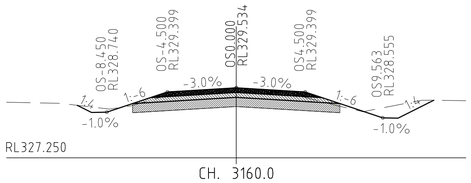
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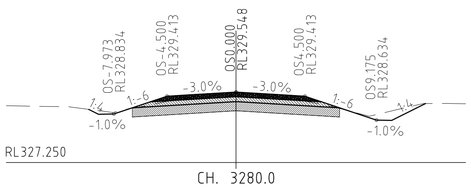
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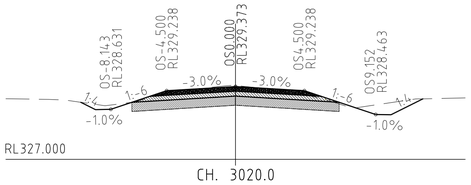
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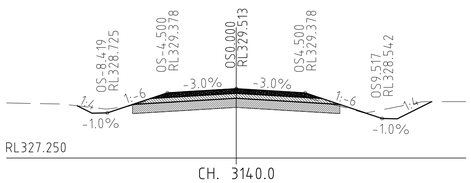
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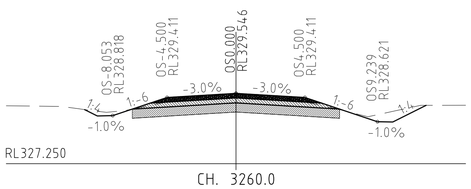
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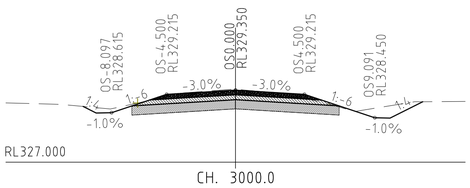
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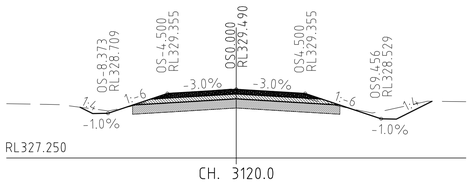
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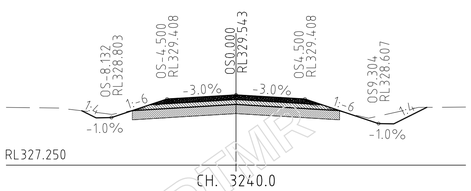
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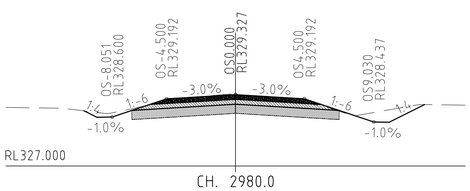
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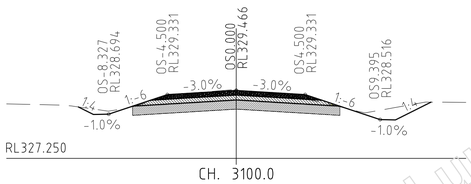
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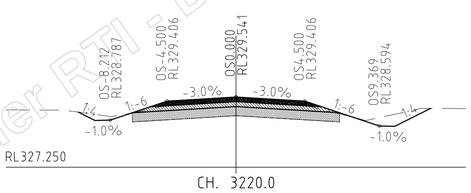
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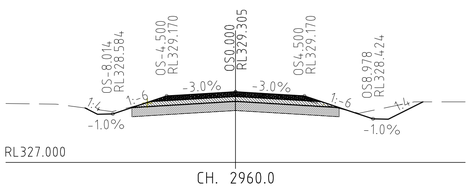
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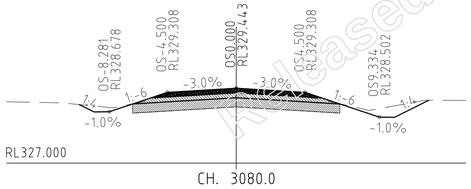
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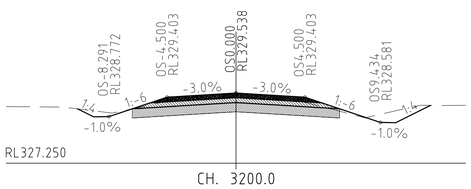
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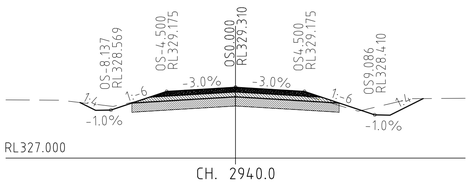
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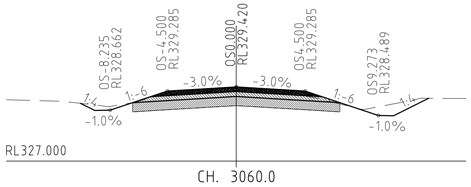
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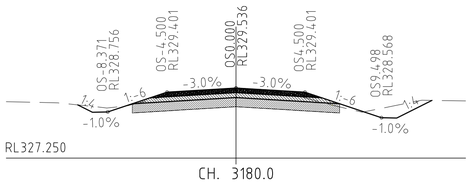
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CH. 3060.0



CH. 3180.0



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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00043	CROSS SECTIONS SHEET 10 OF 11							
S00B01-ARW-CIV-CRS-00041	CROSS SECTIONS SHEET 8 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

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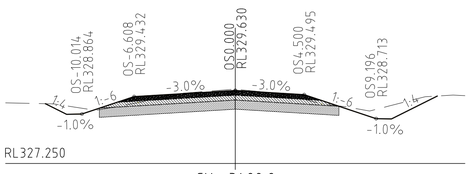
SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 9 OF 11

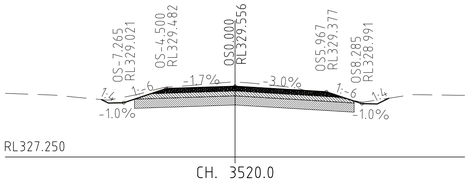
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CONTRACTOR DWG No. 201237 C148
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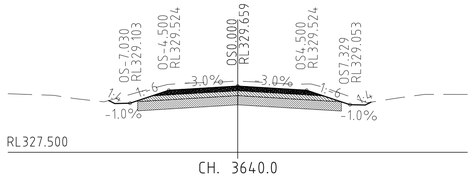
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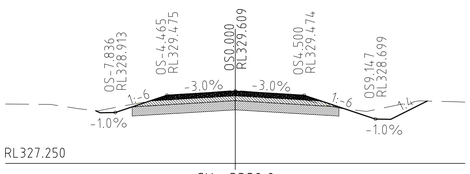
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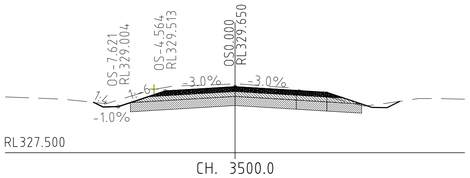
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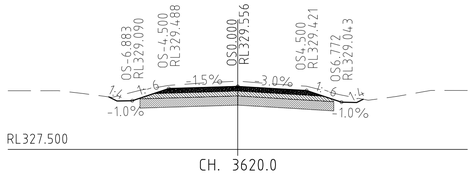
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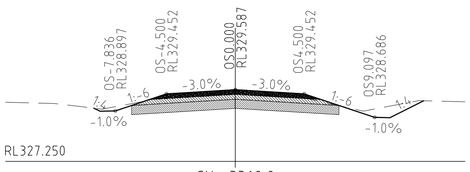
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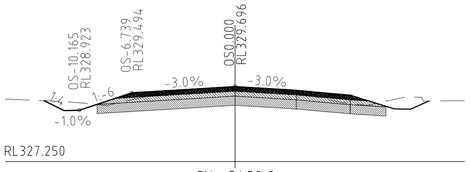
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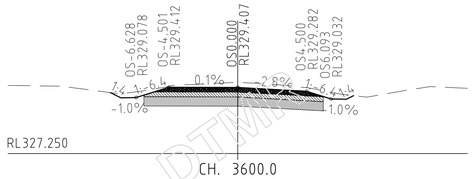
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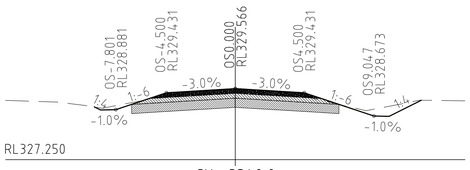
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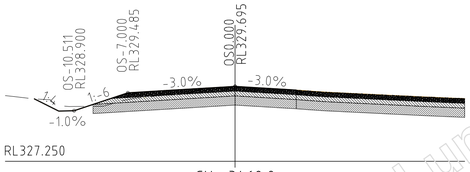
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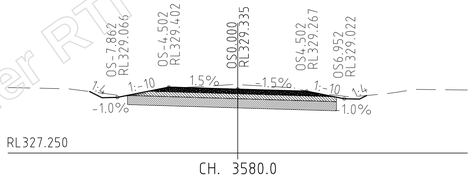
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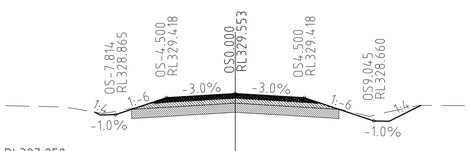
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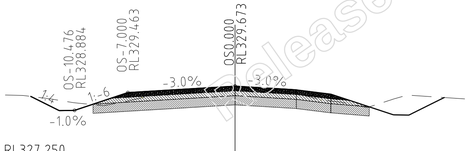
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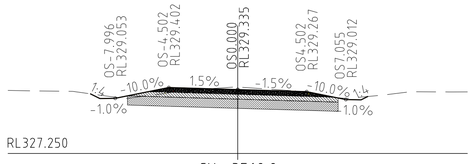
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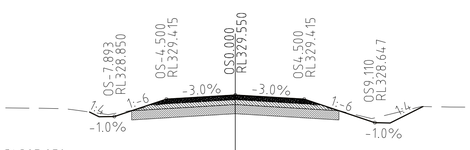
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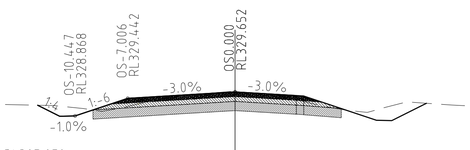
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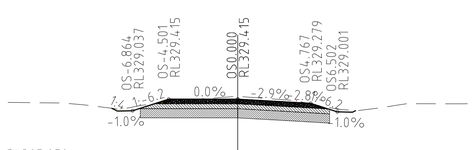
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CH. 3300.0



CH. 3420.0



CH. 3540.0

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S00B01-ARW-CIV-CRS-00042	CROSS SECTIONS SHEET 9 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C149

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 10 OF 11

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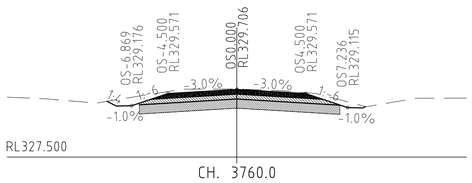
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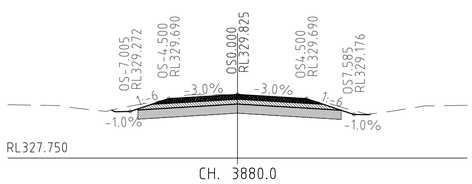
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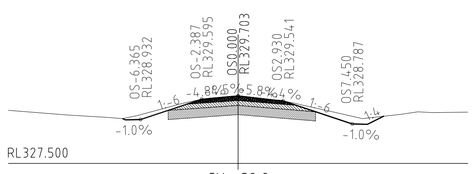
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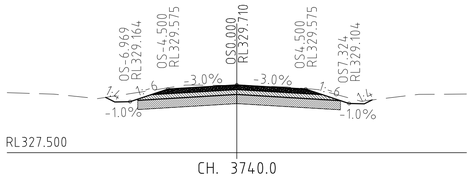
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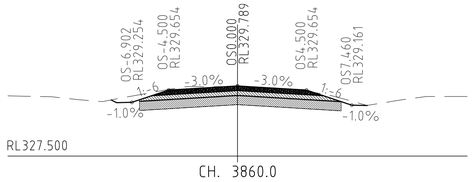
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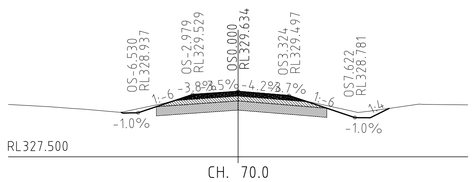
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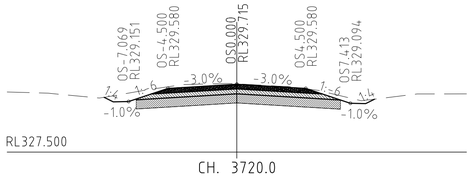
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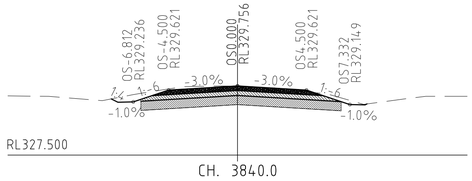
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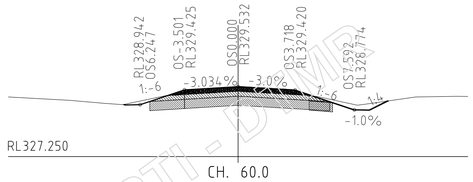
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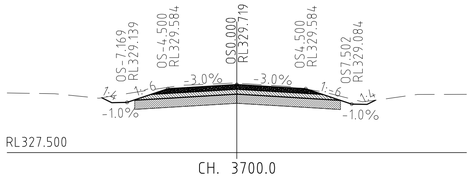


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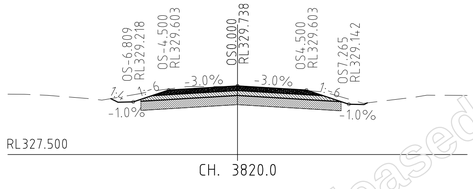


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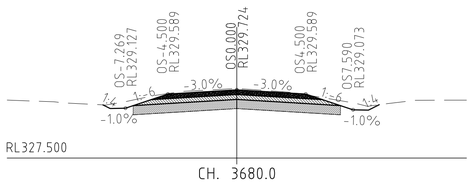
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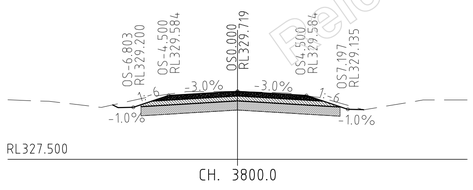
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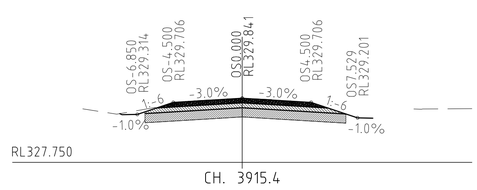
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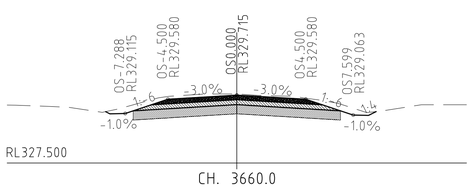
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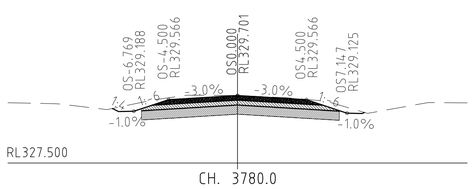
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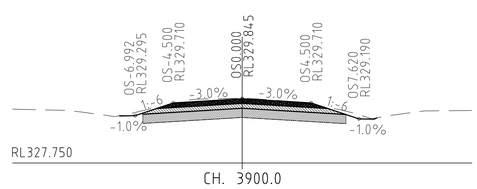
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CH. 3900.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00043	CROSS SECTIONS SHEET 10 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C150

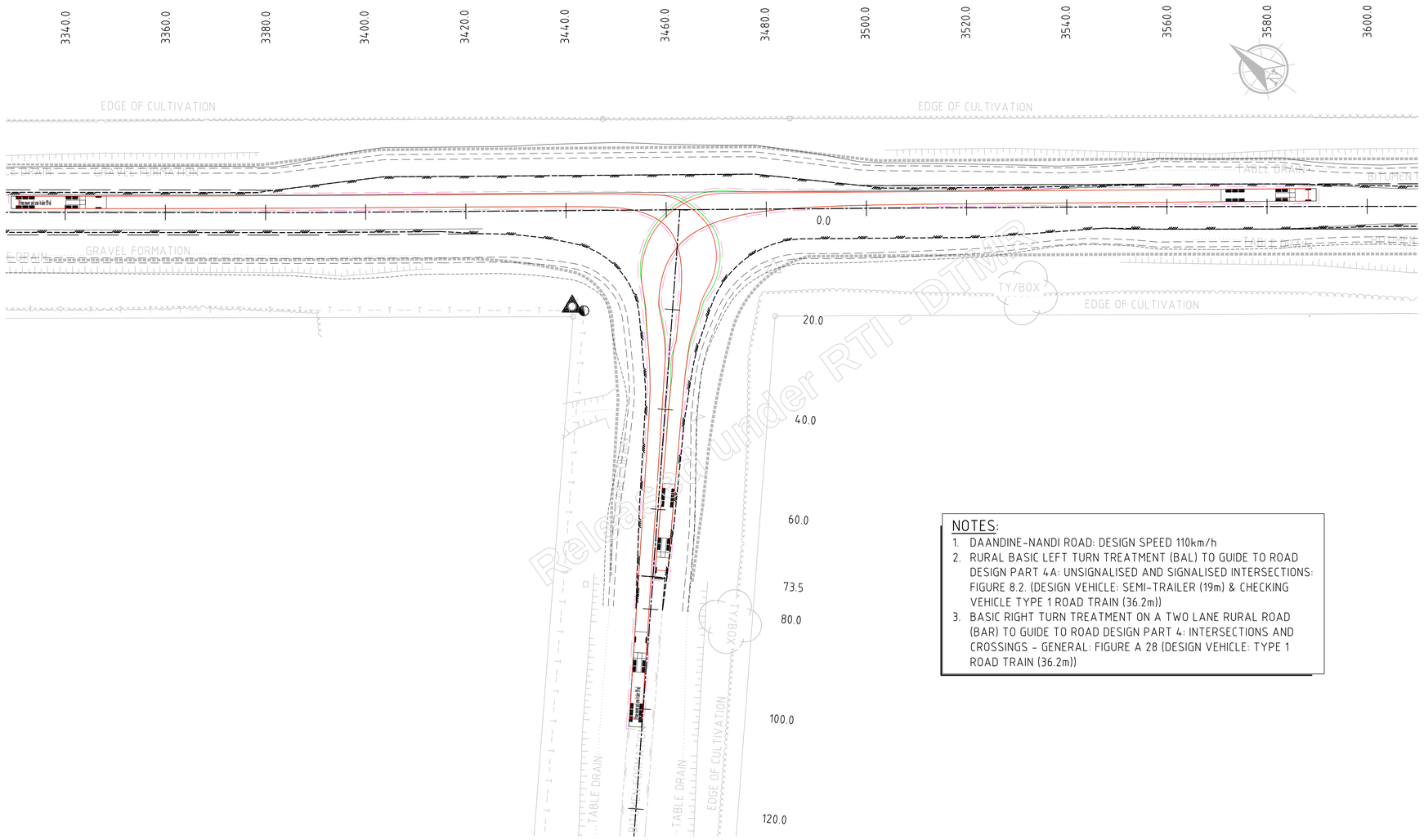
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 11 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00044

SCALE AS SHOWN

REV 0

A1



NOTES:

1. DAANDINE-NANDI ROAD: DESIGN SPEED 110km/h
2. RURAL BASIC LEFT TURN TREATMENT (BAL) TO GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS: FIGURE 8.2. (DESIGN VEHICLE: SEMI-TRAILER (19m) & CHECKING VEHICLE TYPE 1 ROAD TRAIN (36.2m))
3. BASIC RIGHT TURN TREATMENT ON A TWO LANE RURAL ROAD (BAR) TO GUIDE TO ROAD DESIGN PART 4: INTERSECTIONS AND CROSSINGS - GENERAL: FIGURE A 28 (DESIGN VEHICLE: TYPE 1 ROAD TRAIN (36.2m))

10 0 10 20 30 40 50m

SCALE 1:500 (A1)

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S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C160

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
VEHICLE SWEPT PATHS LAYOUT SHEET 1 OF 2

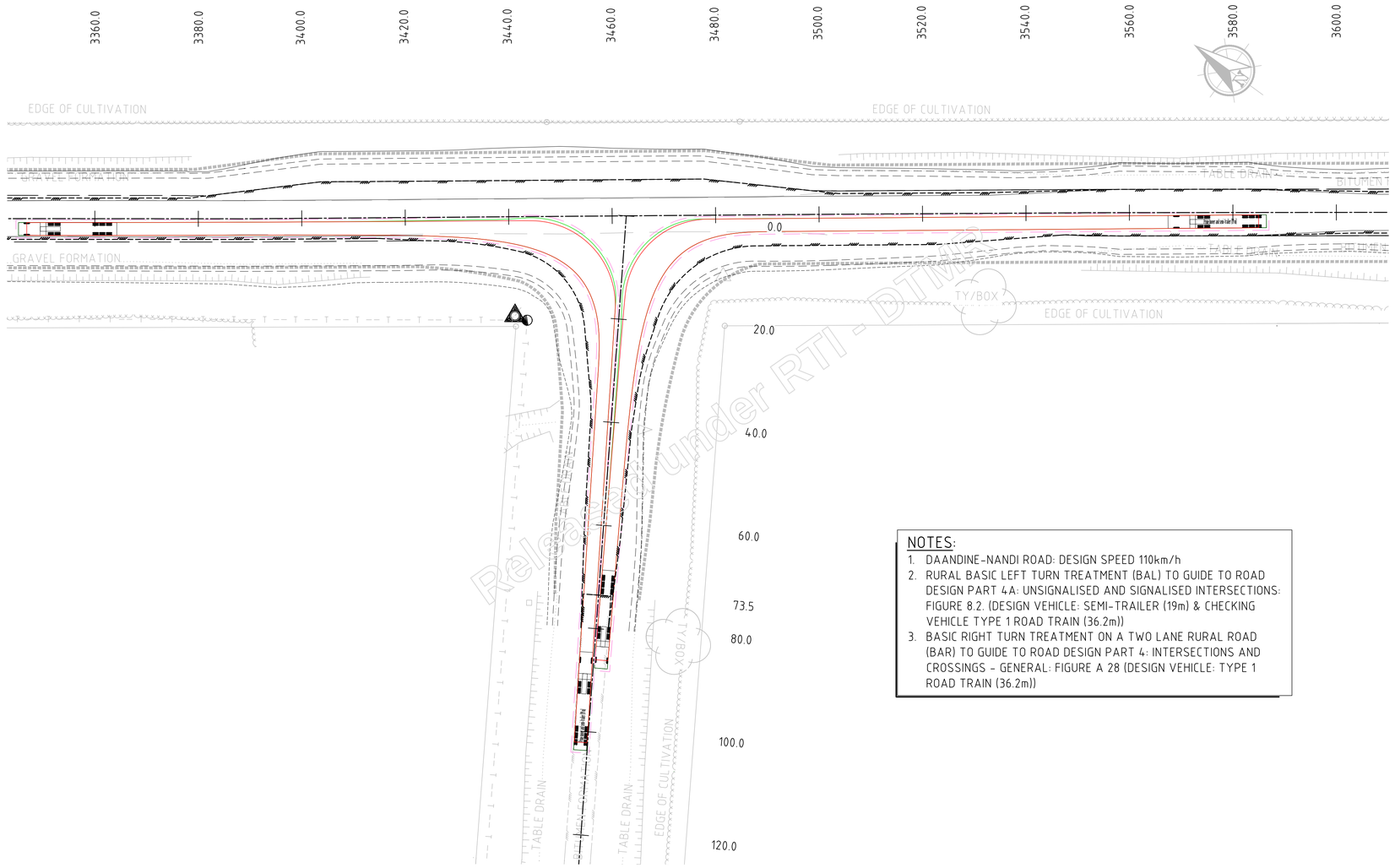
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SCALE 1:500m

REV 0

A1

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NOTES:

1. DAANDINE-NANDI ROAD: DESIGN SPEED 110km/h
2. RURAL BASIC LEFT TURN TREATMENT (BAL) TO GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS: FIGURE 8.2. (DESIGN VEHICLE: SEMI-TRAILER (19m) & CHECKING VEHICLE TYPE 1 ROAD TRAIN (36.2m))
3. BASIC RIGHT TURN TREATMENT ON A TWO LANE RURAL ROAD (BAR) TO GUIDE TO ROAD DESIGN PART 4: INTERSECTIONS AND CROSSINGS - GENERAL: FIGURE A 28 (DESIGN VEHICLE: TYPE 1 ROAD TRAIN (36.2m))

10 0 10 20 30 40 50m

SCALE 1:500 (A1)

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S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C161

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
VEHICLE SWEPT PATHS LAYOUT SHEET 2 OF 2

DRAWING No. S00B01-ARW-CIV-LAY-00057

SCALE 1:500m

REV 0

A1

SETOUT - CONTROL LINE SECTION 1 VERTICAL POINTS

PT	CHAINAGE	HEIGHT	GRADE	K VALUE	RADIUS	LENGTH
CT	60.936	327.911	-0.10%			
IP 5	61.412	327.910				
TC	75.125	327.865	-0.30%			
IP 6	140.867	327.647		305.00	30500.000	131.483
CT	206.608	327.713	0.10%			
IP 7	226.293	327.733				
IP 8	389.076	327.578				
IP 9	490.774	327.459				
IP 10	560.537	327.525				
IP 11	665.770	327.392				
IP 12	790.250	327.470				
TC	903.033	327.738	0.20%			
IP 13	948.861	327.846		95.30	9530.000	91.657
CT	994.690	327.514	-0.70%			
TC	1049.767	327.115	-0.70%			
IP 14	1067.884	326.984		50.00	5000.000	36.233
CT	1086.000	326.984	0.00%			
TC	1151.000	326.984	0.00%			
IP 15	1167.383	326.984		50.00	5000.000	32.766
CT	1183.766	327.091	0.70%			
TC	1194.272	327.160	0.70%			
IP 16	1218.076	327.316		83.60	8360.000	47.607
CT	1241.879	327.336	0.10%			
IP 17	1481.082	327.542				
IP 18	1659.555	327.880				
IP 19	1953.145	328.268				
IP 20	2187.469	328.500				
IP 21	2384.080	328.593				
IP 22	2641.464	329.013				
IP 23	2825.198	329.338				
IP 24	2961.004	329.305				
IP 25	3157.607	329.534				
IP 26	3328.391	329.554				
TC	3461.815	329.697	0.10%			
IP 27	3500.349	329.738		83.60	8360.000	77.067
CT	3538.882	329.424	-0.80%			
TC	3541.706	329.401	-0.80%			
IP 28	3549.853	329.335		20.00	2000.000	16.294
CT	3558.000	329.335	0.00%			
TC	3583.000	329.335	0.00%			
IP 29	3591.180	329.335		20.00	2000.000	16.361
CT	3599.361	329.402	0.80%			
TC	3604.692	329.445	0.80%			
IP 30	3639.821	329.732		83.60	8360.000	70.259
CT	3674.950	329.725	0.00%			
IP 31	3780.590	329.701				
IP 32	3842.756	329.759				
IP 33	3892.631	329.847				
IP 34	3915.400	329.841				

SETOUT - CONTROL LINE SECTION 1 HORIZONTAL POINTS

PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH
IP 3	60.000	304640.172	7000434.889	327.911			
IP 4	356.677	304600.356	7000140.896	327.609			
IP 5	677.085	304556.537	6999823.498	327.399			
TC	747.214	304546.826	6999754.045	327.443	187°57'36.39"		
IP 6	794.996	304540.208	6999706.719	327.481		R = 3000.000	95.564
CT	842.778	304532.087	6999659.628	327.595	189°47'06.92"		
TS	847.082	304531.355	6999655.387	327.605	189°47'06.92"		
SC	907.082	304524.951	6999595.827	327.746	178°50'13.26"	L = 60.000	
IP 7	940.911	304514.705	6999558.843	327.752		R = -157.000	67.658
CS	974.740	304540.633	6999530.549	327.638	154°08'45.16"	L = 60.000	
ST	1034.740	304573.394	6999480.398	327.224	143°11'51.50"		
TC	1152.475	304643.924	6999386.127	326.984	143°11'51.50"		
IP 8	1172.311	304655.806	6999370.245	327.029		R = 5000.000	39.671
CT	1192.146	304667.562	6999354.268	327.146	143°39'08.04"		
IP 9	1527.950	304866.589	6999083.800	327.631			
IP 10	1676.366	304954.032	6998963.880	327.902			
IP 11	2031.145	305163.437	6998677.492	328.345			
IP 12	2714.300	305567.618	6998126.731	329.142			
IP 13	2861.373	305653.950	6998007.662	329.329			
IP 14	3294.797	305910.349	6997658.212	329.550			
IP 15	3388.942	305965.672	6997582.036	329.618			
IP 16	3501.715	306032.711	6997491.353	329.644			
IP 17	3553.325	306063.318	6997449.798	329.340			
IP 18	3619.939	306102.564	6997395.973	329.556			
IP 19	3738.337	306172.547	6997300.471	329.710			
IP 20	3915.400	306277.614	6997157.951	329.841	143°36'07.18"		

SETOUT - CONTROL LINE THETEN ROAD No RCBC HORIZONTAL POINTS

PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING
IP 1	0.000	306009.540	6997522.697		238°09'46.35"
IP 2	80.000	305941.576	6997480.496	329.702	

SETOUT - CONTROL LINE THETEN ROAD No RCBC VERTICAL POINTS

PT	CHAINAGE	HEIGHT	GRADE	K VALUE	RADIUS	LENGTH
IP 1	0.001	329.697				
IP 2	4.049	329.576				
TC	11.381	329.393	-2.50%			
IP 3	26.381	329.018		7.39	738.820	30.000
CT	41.381	329.252	1.60%			
TC	53.008	329.433	1.60%			
IP 4	63.008	329.589		22.38	2237.490	20.000
CT	73.008	329.656	0.70%			
IP 5	80.000	329.703				

FOR BENCHMARK SITE-COORDINATES, DATUM AND OTHER SURVEY INFORMATION REFER TO DWG S00B01-ARW-CIV-SUR-00014

Released for Tender

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6							
S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C170

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CONTROL LINE SETOUT DETAILS

DRAWING No. S00B01-ARW-CIV-DET-00059

SCALE

REV 0 A1

SEDIMENT & EROSION CONTROL NOTES

GENERAL

1. THE EROSION & SEDIMENT CONTROL MEASURES SHOWN ARE THE MINIMUM REQUIREMENTS TO BE INSTALLED UPON COMPLETION OF THE WORKS. THE CONTRACTOR SHALL INSTALL ADDITIONAL MEASURES AS REQUIRED TO TAKE ACCOUNT OF CONSTRUCTION ACTIVITIES & SEQUENCING. NOT WITHSTANDING, THE SUPERVISING ENGINEER MAY DIRECT ADDITIONAL MEASURES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE ENVIRONMENTAL PROTECTION ACT (1994) & ANY SITE OR PROJECT SPECIFIC REQUIREMENTS ISSUED BY THE LOCAL COUNCIL UNDER THE SUSTAINABLE PLANNING ACT (2009).

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION

3. THE CONTRACTOR SHALL PREPARE AN EROSION & SEDIMENT CONTROL MANAGEMENT PLAN (E&SCP) & SUBMIT TO THE SUPERVISING ENGINEER FOR APPROVAL.
4. WRITTEN APPROVAL IS TO BE OBTAINED FROM DOWNSTREAM LANDOWNERS FOR TEMPORARY DISCHARGE OF RUNOFF ONTO ADJOINING LAND.
5. PROGRAM CONSTRUCTION ACTIVITIES SO AS TO MINIMISE DISTURBANCE TO EXISTING VEGETATION COVER.
6. CONSTRUCTION OF AN ENTRY/EXIT POINT TO THE SITE SHOULD BE PROVIDED SO THAT SEDIMENT IS NOT TRACKED OFF SITE. REFER I.P.W.E.A.Q. STD. DWG. D-0040 (ALTERNATIVE 1 PREFERRED). DESIGNATED PARKING AREAS TO BE ESTABLISHED DURING CONSTRUCTION CLEAR OF TRAFFIC LANES AND PROPERTY ACCESSES.
7. ALL MEASURES TO BE OPERATIONAL BEFORE COMMENCEMENT OF UP-SLOPE EARTHWORKS.

BULK EARTHWORKS

8. TOPSOIL SHOULD BE STOCKPILED ON SITE FOR LATER USE.
9. WHERE PRACTICABLE MAINTAIN VEGETATION IN A HEALTHY STATE DURING THE CONSTRUCTION PROCESS.
10. WHEN UP-SLOPE WATER IS DIVERTED AROUND A WORK SITE IT IDEALLY SHOULD BE DISCHARGED AS SHEET FLOW THROUGH AN UNDISTURBED AREA.

CONSTRUCTION OPERATIONS

11. ERODABLE MATERIAL MISTAKENLY PLACED WITHIN THE ROAD RESERVE (INCLUDING ACCIDENTAL SPILLAGE & TRACKING OF SUCH MATERIALS ONTO THE ROAD) THAT CANNOT BE PREVENTED THROUGH REASONABLE MEANS MUST BE:
    (a) REMOVED IMMEDIATELY IF RAINFALL IS IMMINENT OR OCCURRING.
    (b) REMOVED PRIOR TO THE END OF THE DAY'S WORK IF RAINFALL IS NOT EXPECTED.
12. MATERIALS SHOULD BE SWEPT FROM THE ROAD, NOT WASHED DOWN THE GUTTER.
13. ALL SOLID WASTE SHOULD BE STORED ON SITE IN SUCH A MANNER THAT IS PREVENTED FROM LEAVING THE SITE EITHER BY THE ACTION OF WIND OR WATER.
14. SMALLER MATERIALS, SUCH AS LITTER, SHOULD BE CONTAINED IN COVERED BINS.

STOCKPILES

15. STOCKPILES ARE NOT BE STORED WITHIN THE ROAD RESERVE, UNLESS APPROVED BY COUNCIL.
16. WHERE NECESSARY STOCKPILE LOSSES CAN BE MINIMIZED WITH THE USE OF COVERS.
17. ALL STOCKPILES & BUILDING MATERIAL SHOULD BE LOCATED WITHIN THE SEDIMENT CONTROL ZONE.
18. TO MINIMIZE EROSION & THE LOSS OF SAND & SOIL, STOCKPILES SHOULD NOT BE LOCATED WITHIN AN OVERLAND FLOW PATH. IF IT IS IMPRACTICAL TO AVOID STORMWATER RUNOFF BEING DIRECTED TO A STOCKPILE, THEN A PERIMETER BANK SHOULD BE CONSTRUCTED UP-SLOPE OF THE STOCKPILE TO DIRECT RUNOFF IN A CONTROLLED MANNER AROUND THE STOCKPILE.
19. STOCKPILES TO HAVE MAXIMUM 1(V):6(H) SIDE BATTERS.

DRAINAGE

DIVERSION DRAINS / BANKS

20. WHERE PRACTICAL OR WHERE STORMWATER RUNOFF FROM MORE THAN 0.5Ha FEEDS INTO THE WORK SITE, DIVERT UP-SLOPE WATER AROUND THE DISTURBED AREA USING CATCH DRAINS OR PERIMETER BANKS. LINE HIGH VELOCITY DRAINS WITH ROCK, TURF OR GEOTEXTILE TO AVOID UNNECESSARY EROSION.

SEDIMENT BARRIERS

SEDIMENT FENCES

23. INSTALL SEDIMENT FENCE(S) ALONG THE LOW SIDE OF THE SITE & IDEALLY ALONG THE LINE OF CONSTANT LAND LEVEL TO PREVENT THE CONCENTRATION OF STORMWATER RUNOFF. MAXIMUM CATCHMENT AREA 0.6Ha PER 100m LENGTH OF FENCE. IN AREAS WHERE IT IS EITHER UNDESIRABLE OR IMPRACTICAL TO BURY THE LOWER EDGE OF THE SEDIMENT FENCE, THE LOWER 200mm (MIN.) PORTION OF THE FABRIC SHOULD BE PLACED ON THE GROUND UP SLOPE OF THE FENCE & BURIED UNDER A 100mm (MIN.) LAYER OF AGGREGATE REFER I.P.W.E.A.Q. STD. DWG. D-0040. WOVEN FABRICS ARE PREFERRED HOWEVER NON-WOVEN FABRICS MAY BE USED ON SMALL WORK SITES WHERE OPERATIONAL PERIOD IS LESS THAN 6 MONTHS OR ON SITES WHERE SIGNIFICANT RUNOFF IS NOT EXPECTED. STRAWBALE SEDIMENT FENCES SHOULD NOT BE USED UNLESS OTHER OPTIONS ARE NOT AVAILABLE.

EROSION CONTROL BLANKETS

24. USE EROSION CONTROL BLANKETS OR MATTING ON SOILS WITH A HIGH EROSION RISK, ON BATTERS GREATER THAN 1(V):4(H) & / OR WHERE THERE IS A LIKELIHOOD OF DELAY IN COMPLETING PERMANENT EROSION CONTROL MEASURES. REFER MANUFACTURER FOR ADVICE ON MOST SUITABLE PRODUCT FOR EACH SITE.

REHABILITATION

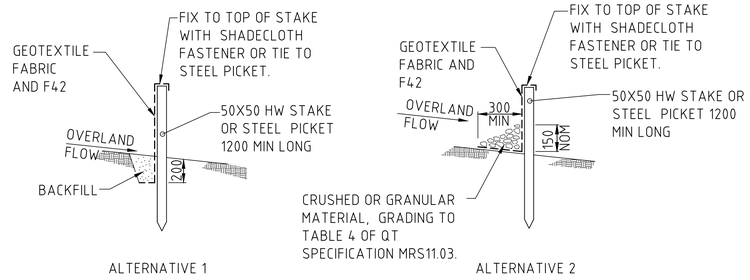
GRASS SEEDING & TURFING

25. ALL DISTURBED AREAS ARE TO BE SEEDED, & / OR TURFED, WITHIN SEVEN DAYS OF FINAL TRIMMING & TOPSOILING. SEED MIX TO BE CONFIRMED WITH SUPERVISING ENGINEER.
26. WATERING OF GRASS SEEDED AREAS SHALL BE CARRIED OUT AT THE FOLLOWING FREQUENCIES TO ACHIEVE A 75% STRIKE OVER THE ENTIRE AREA.
    (a) WEEK 1 - ONCE EVERY DAY
    (b) WEEKS 2 TO 4 - ONCE EVERY SECOND DAY
    (c) WEEKS 5 TO 12 - TWICE EVERY WEEK
    (d) WEEKS 13 TO 26 - ONCE EVERY WEEK

    ONE WATERING SHALL BE DEFINED AS 5L/m^2 OF WATER IN NOT LESS THAN ONE HOUR. WATER SHALL BE APPLIED USING A FINE SPRAY.

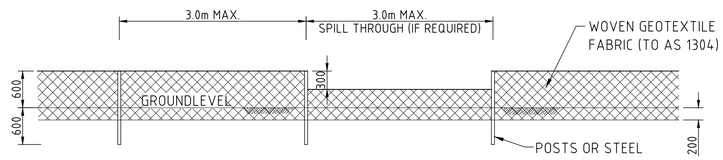
MAINTENANCE

27. SEDIMENT FENCES SHOULD BE REPLACED IF THE FABRIC IS RIPPED OR OTHERWISE DAMAGED. THE MAINTENANCE OF THE SEDIMENT FENCES INCLUDES THE REMOVAL OF SEDIMENT DEPOSITED UP-SLOPE OF THE FENCE & RETRENCHING THE FABRIC WHEN THE FENCE IS 25% FULL.
28. AS A GUIDE SEDIMENT CONTROL DEVICES SHOULD BE INSPECTED AS FOLLOWS:
    (a) WEEKLY DURING DRY WEATHER.
    (b) PRIOR TO PREDICTED STORM EVENTS.
    (c) TWICE DAILY DURING PROLONGED RAIN.
    (d) DURING & AFTER MAJOR STORM EVENTS.
29. THE CONTRACTOR SHALL MAINTAIN ALL SEDIMENT CONTROL DEVICES FOR THE FULL EXTENT OF THE CONSTRUCTION PERIOD & DEFECTS LIABILITY PERIOD (IF SPECIFIED).
30. ALL DRAINAGE & TEMPORARY EROSION & SEDIMENT CONTROL MEASURES ARE TO REMAIN IN PLACE UNTIL EITHER:
    (a) PERMANENT MEASURES HAVE BEEN CONSTRUCTED & FOUND TO BE EFFECTIVE.
    (b) 75% OF THE GROUND COVER OVER THE DISTURBED AREA HAS BEEN RE-ESTABLISHED .
    (c) NOTICE IS GIVEN BY SUPERVISING ENGINEER FOR REMOVAL.



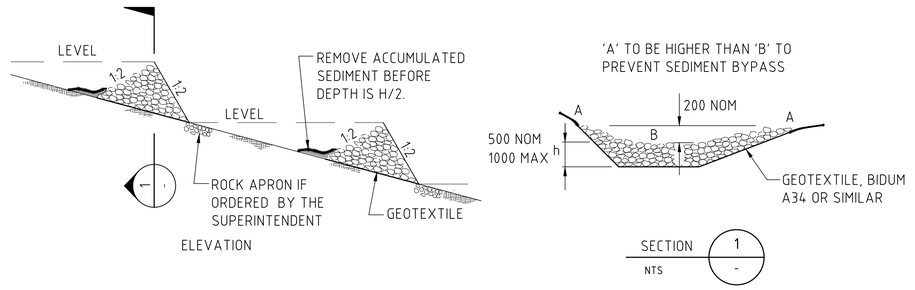
SEDIMENT FENCE SECTIONS

N.T.S



SEDIMENT FENCE WITH OVERFLOW SYSTEM

N.T.S



ROCK CHECK DAMS - FLOW CONTROL

N.T.S

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal. professional. practical

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STATUS FOR CONSTRUCTION

CONTRACTOR DWG No. 201237 C180

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
EROSION AND SEDIMENT CONTROL DETAILS

DRAWING No. S00B01-ARW-CIV-DET-00060

SCALE N.T.S.

REV 0

A1



LOCALITY PLAN
NOT TO SCALE

DRAWING LIST		
DWG.NO.	ARROW DOC. No.	DESCRIPTION
201237 C000	S00B01-ARW-CIV-DET-00056	LOCALITY PLAN LAYOUT
201237 C101	S00B01-ARW-CIV-SUR-00014	SURVEY SHEET 1 OF 6
201237 C102	S00B01-ARW-CIV-SUR-00015	SURVEY SHEET 2 OF 6
201237 C103	S00B01-ARW-CIV-SUR-00016	SURVEY SHEET 3 OF 6
201237 C104	S00B01-ARW-CIV-SUR-00017	SURVEY SHEET 4 OF 6
201237 C105	S00B01-ARW-CIV-SUR-00018	SURVEY SHEET 5 OF 6
201237 C106	S00B01-ARW-CIV-SUR-00019	SURVEY SHEET 6 OF 6
201237 C110	S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6
201237 C111	S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6
201237 C112	S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6
201237 C113	S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6
201237 C114	S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6
201237 C115	S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6
201237 C116	S00B01-ARW-CIV-LAY-00055	THETEN ROAD INTERSECTION LAYOUT
201237 C120	S00B01-ARW-CIV-DET-00057	TYPICAL SECTIONS AND DETAILS
201237 C121	S00B01-ARW-CIV-DET-00058	DRAINAGE DETAIL
201237 C122	S00B01-ARW-CIV-GAT-00154	DRIVEWAY GENERAL ARRAGEMENT
201237 C130	S00B01-ARW-CIV-LSN-00029	LONGITUDINAL SECTIONS SHEET 1 OF 7
201237 C131	S00B01-ARW-CIV-LSN-00030	LONGITUDINAL SECTIONS SHEET 2 OF 7
201237 C132	S00B01-ARW-CIV-LSN-00031	LONGITUDINAL SECTIONS SHEET 3 OF 7
201237 C133	S00B01-ARW-CIV-LSN-00032	LONGITUDINAL SECTIONS SHEET 4 OF 7
201237 C134	S00B01-ARW-CIV-LSN-00033	LONGITUDINAL SECTIONS SHEET 5 OF 7
201237 C135	S00B01-ARW-CIV-LSN-00034	LONGITUDINAL SECTIONS SHEET 6 OF 7
201237 C136	S00B01-ARW-CIV-LSN-00035	LONGITUDINAL SECTIONS SHEET 7 OF 7
201237 C140	S00B01-ARW-CIV-CRS-00034	CROSS SECTIONS SHEET 1 OF 11
201237 C141	S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11
201237 C142	S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11
201237 C143	S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11
201237 C144	S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11
201237 C145	S00B01-ARW-CIV-CRS-00039	CROSS SECTIONS SHEET 6 OF 11
201237 C146	S00B01-ARW-CIV-CRS-00040	CROSS SECTIONS SHEET 7 OF 11
201237 C147	S00B01-ARW-CIV-CRS-00041	CROSS SECTIONS SHEET 8 OF 11
201237 C148	S00B01-ARW-CIV-CRS-00042	CROSS SECTIONS SHEET 9 OF 11
201237 C149	S00B01-ARW-CIV-CRS-00043	CROSS SECTIONS SHEET 10 OF 11
201237 C150	S00B01-ARW-CIV-CRS-00044	CROSS SECTIONS SHEET 11 OF 11
201237 C160	S00B01-ARW-CIV-LAY-00056	VEHICLE SWEPT PATHS LAYOUT SHEET 1 OF 2
201237 C161	S00B01-ARW-CIV-LAY-00057	VEHICLE SWEPT PATHS LAYOUT SHEET 2 OF 2
201237 C170	S00B01-ARW-CIV-DET-00059	CONTROL LINE SETOUT DETAILS
201237 C180	S00B01-ARW-CIV-DET-00060	EROSION AND SEDIMENT CONTROL DETAILS

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05 05 2023

Signed (if wet ink):

Released under RTI DTMR

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		6	24.03.23	AS BUILT	JAG	PN	PML	SW
		5	05.10.22	ISSUE FOR CONSTRUCTION	JAG	PRH	PML	PML
		4	08.09.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		3	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		2	11.03.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

STATUS ASB

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C000

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

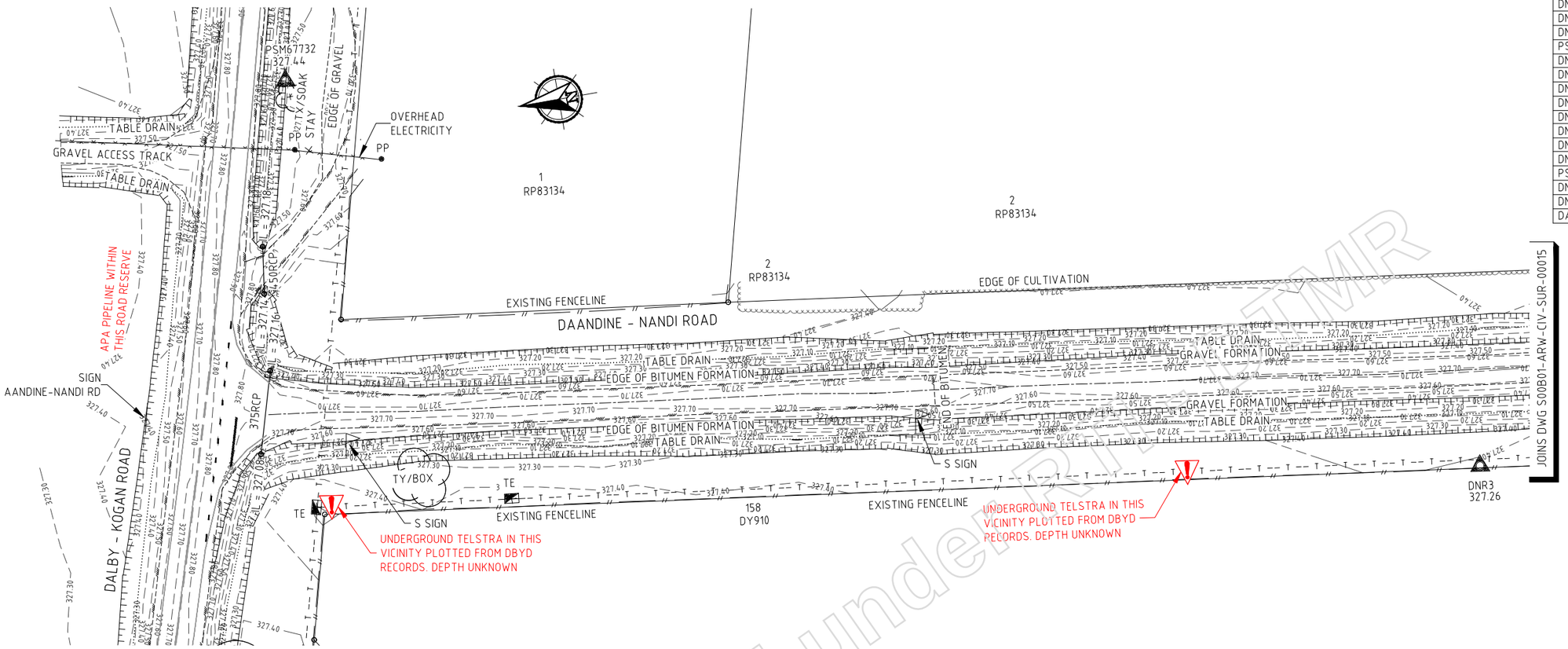
DRAWING No. S00B01-ARW-CIV-DET-00056

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1 LOCALITY PLAN LAYOUT

SCALE N.T.S.

REV 6

A1



BENCHMARK SITE CO - ORDINATES

PT	EASTING	NORTHING	ELEVATION	CODE
DKR2	304481.751	7000565.077	327.25	DKR/2
DKR1	304936.712	7000429.689	327.612	DKR/1
DNR2	305981.249	6997528.738	329.205	DNR/2
PSM67732	304714.542	7000465.788	327.438	PSM/67732
PSM69220	313595.791	6997696.611	330.156	PSM69220
DNR3	304592.794	7000235.236	327.263	DNR/3
DNR4	304603.968	7000041.368	327.274	DNR/4
DNR5	304509.332	6999617.893	326.972	DNR/5
PSM63061	304508.955	6999537.333	326.698	PSM/63061
DNR6	304644.899	6999412.780	327.081	DNR/6
DNR7	304792.937	6999211.462	327.176	DNR/7
DNR8	304946.546	6999003.325	327.460	DNR/8
DNR9	305097.444	6998797.639	327.804	DNR/9
DNR10	305249.993	6998590.123	328.017	DNR/10
DNR11	305376.573	6998418.433	328.227	DNR/11
DNR12	305533.949	6998203.646	328.553	DNR/12
DNR13	305674.445	6998009.337	328.871	DNR/13
PSM181452	305755.308	6997901.262	329.042	PSM/181452
DNR14	305901.249	6997700.550	329.158	DNR/14
DNR15	306123.446	6997341.111	329.397	DNR/15
DAANDINE2	304547.900	6999904.194	326.992	BM/2

SURVEY INFORMATION

SURVEYOR: MURRAY & ASSOCIATES (QLD) PTY LTD

DATE OF SURVEY: 25 MAY 2020
ORIGIN: PSM 67732
EASTING: 304714.542
NORTHING: 7000465.788
LEVEL: RL 327.438m
LEVEL DATUM: AHD
HORIZONTAL DATUM: MGA94 (ZONE 56) AUSGEOID 09
LOCAL AUTHORITY: WESTERN DOWNS REGIONAL COUNCIL

THE CONTRACTOR SHOULD NOTE THAT ALL DESIGN SETOUT INFORMATION IS RELATIVE TO THE SURVEY. THE CONTRACTOR SHALL VERIFY THE SURVEY DATUM PRIOR TO COMMENCEMENT OF THE WORKS.

SURVEY NOTES:

1. POSITIONS OF SERVICES SHOWN ARE GIVEN FOR GUIDANCE ONLY.
2. UNDERGROUND SERVICES HAVE BEEN LOCATED FROM VISIBLE SURFACE FEATURES ONLY.
3. LOCATIONS AND/OR DEPTHS MAY NOT BE ACCURATELY REPRESENTED AND OTHER SERVICES MAY EXIST ON SITE.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE POSITION OF ALL SERVICES ON SITE PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE.
5. A DBYD ENQUIRY IS TO BE CONDUCTED AND THE RELEVANT AUTHORITY CONTACTED FOR POSSIBLE LOCATION OF ADDITIONAL UNDERGROUND SERVICES.
6. THE PROPERTY BOUNDARIES SHOWN HAVE NOT FULLY BEEN INVESTIGATED FOR THE PURPOSES OF THIS SURVEY. FOR AN ACCURATE DETERMINATION OF THE BOUNDARIES, AN IDENTIFICATION SURVEY WILL BE REQUIRED.
7. CONTRACTOR IS TO CONFIRM SURVEY INFORMATION WITH THE ORIGINAL SURVEYOR.

SURVEY LEGEND

SYMBOL	DESCRIPTION
300.1	EXISTING CONTOUR MINOR (0.1m INTERVAL)
300.5	EXISTING CONTOUR MAJOR (0.5m INTERVAL)
	EXISTING TOP OF BATTER
	EXISTING BOTTOM OF BATTER
//	EXISTING FENCE
	EXISTING GATE
	EXISTING EDGE OF BITUMEN
	EXISTING EDGE OF GRAVEL ROAD
T	EXISTING TELSTRA (PIT)
S	EXISTING SEWER LINE
W	EXISTING WATER LINE
UG	EXISTING UNDERGROUND ELECTRICITY
	EXISTING OVERHEAD POWERLINE
G	EXISTING GAS LINE
	EXISTING TREE LINE
SW	EXISTING STORMWATER

	EXISTING TREE
	SURVEY STATIONS (PSM, STATION, BENCHMARK)
	EXISTING TRAFFIC SIGN
	EXISTING CONTROL POINT
	EXISTING ELECT. LIGHT POLE
	EXISTING ELECTRICITY MANHOLE
	EXISTING POWER POLE
	EXISTING ELECTRICITY PILLAR
	EXISTING ELECTRICITY PIT
	EXISTING FIRE HYDRANT
	EXISTING STORMWATER GRATE
GAS	EXISTING GAS INFRASTRUCTURE
	EXISTING SEWER MANHOLE
	EXISTING SCOUR VALVE
	EXISTING STORMWATER MANHOLE
	EXISTING TELSTRA PIT
	EXISTING TELSTRA PILLAR
	EXISTING WATER METER
	EXISTING WATER VALVE

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR
Position Title:
Date: 05/05/2023
Signed (if wet ink):

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

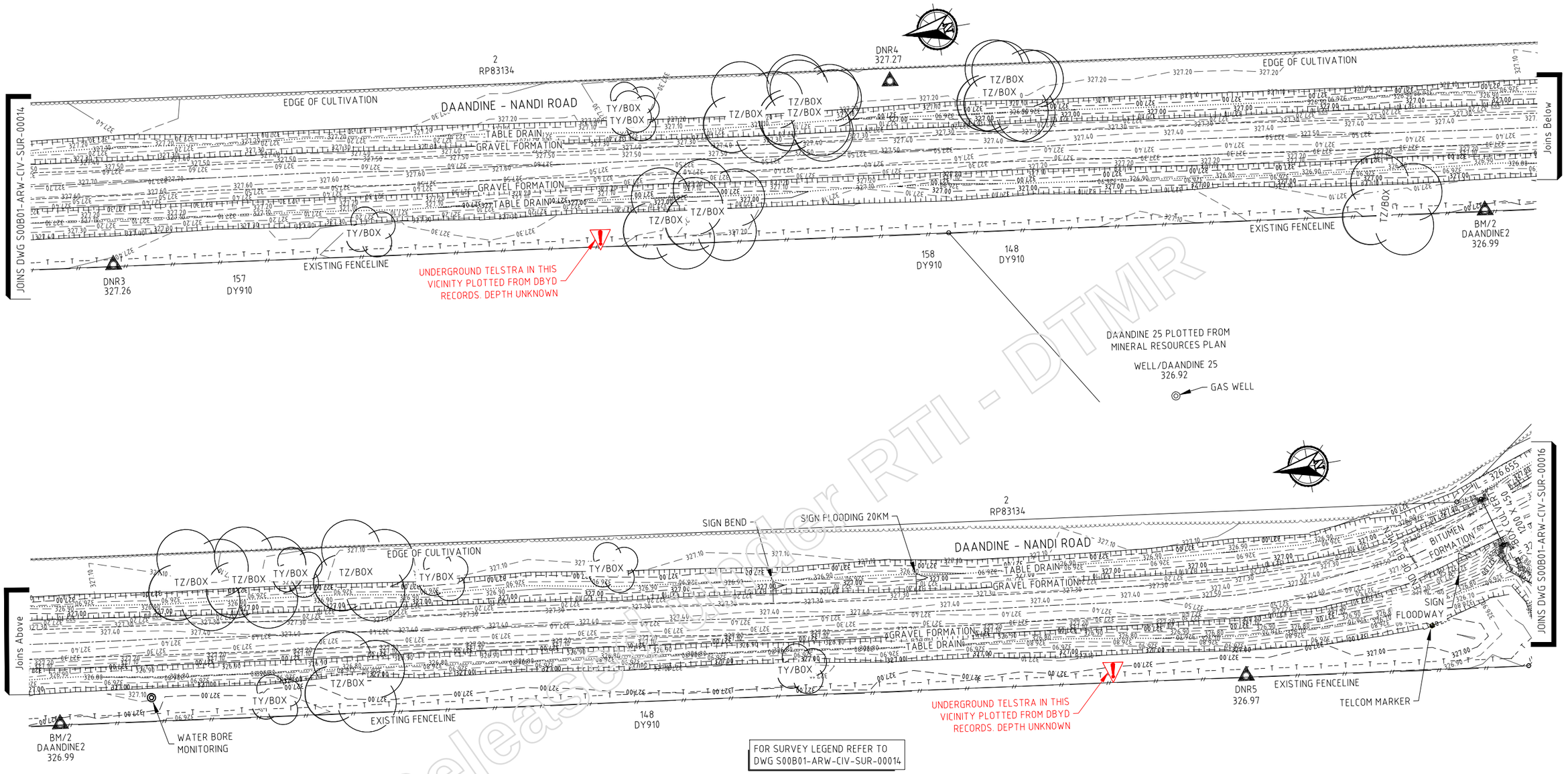
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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-SUR-00015	SURVEY SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION: NR
STATUS: ASB
CONTRACTOR DWG No.: 201237 C101

SITE S00
PLANT B01
SECURITY CLASSIFICATION: RESTRICTED
DRAWING No.: S00B01-ARW-CIV-SUR-00014
SCALE 1:500m
REV 1
A1

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 1 OF 6



FOR SURVEY LEGEND REFER TO DWG S00B01-ARW-CIV-SUR-00014

SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-SUR-00016	SURVEY SHEET 3 OF 6	1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-SUR-00014	SURVEY SHEET 1 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION: NR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

brandon & associates ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS: ASB

CONTRACTOR DWG No.: 201237 C102

SITE: S00

PLANT: B01

SECURITY CLASSIFICATION: RESTRICTED

DRAWING No.: S00B01-ARW-CIV-SUR-00015

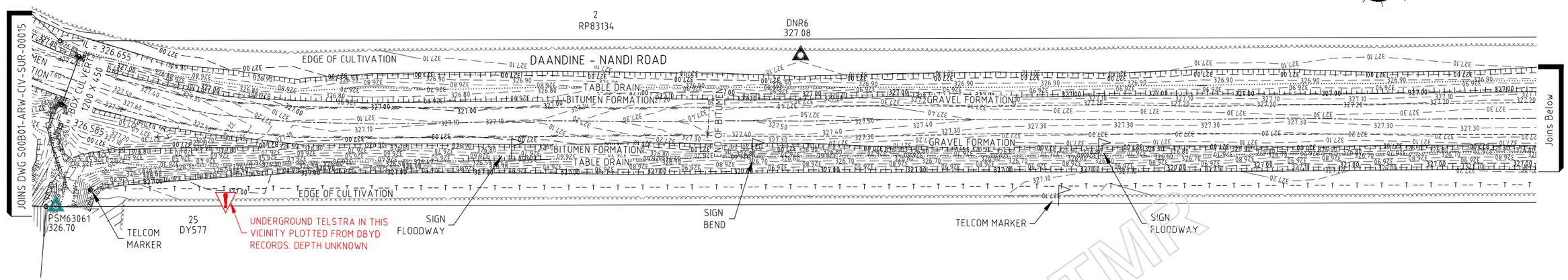
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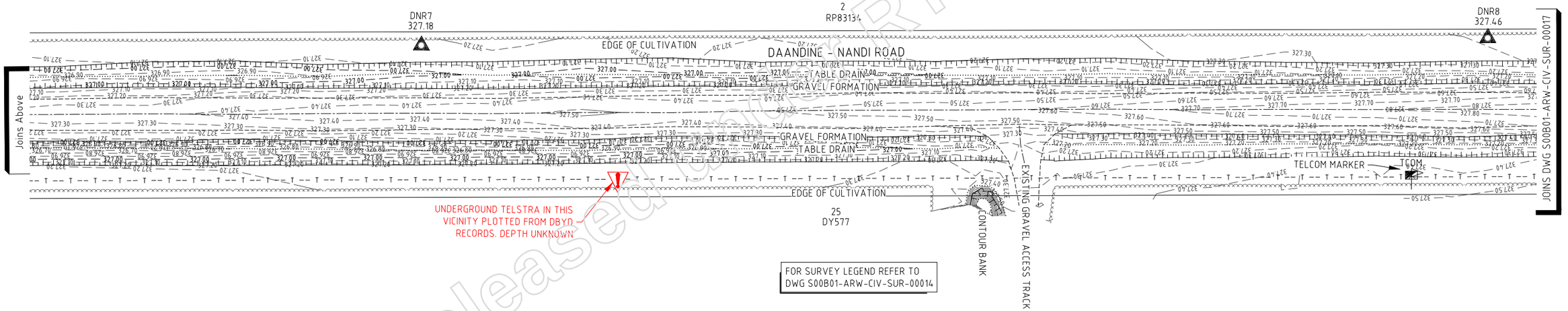
REV: 1

A1

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 2 OF 6

Released under RTI - DTMR





The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-SUR-00017	SURVEY SHEET 4 OF 6	1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-SUR-00015	SURVEY SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION: NR

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arrow energy go further

STATUS: ASB

CONTRACTOR DWG No.: 201237 C103

SITE S00

PLANT B01

SECURITY CLASSIFICATION: RESTRICTED

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 SURVEY SHEET 3 OF 6

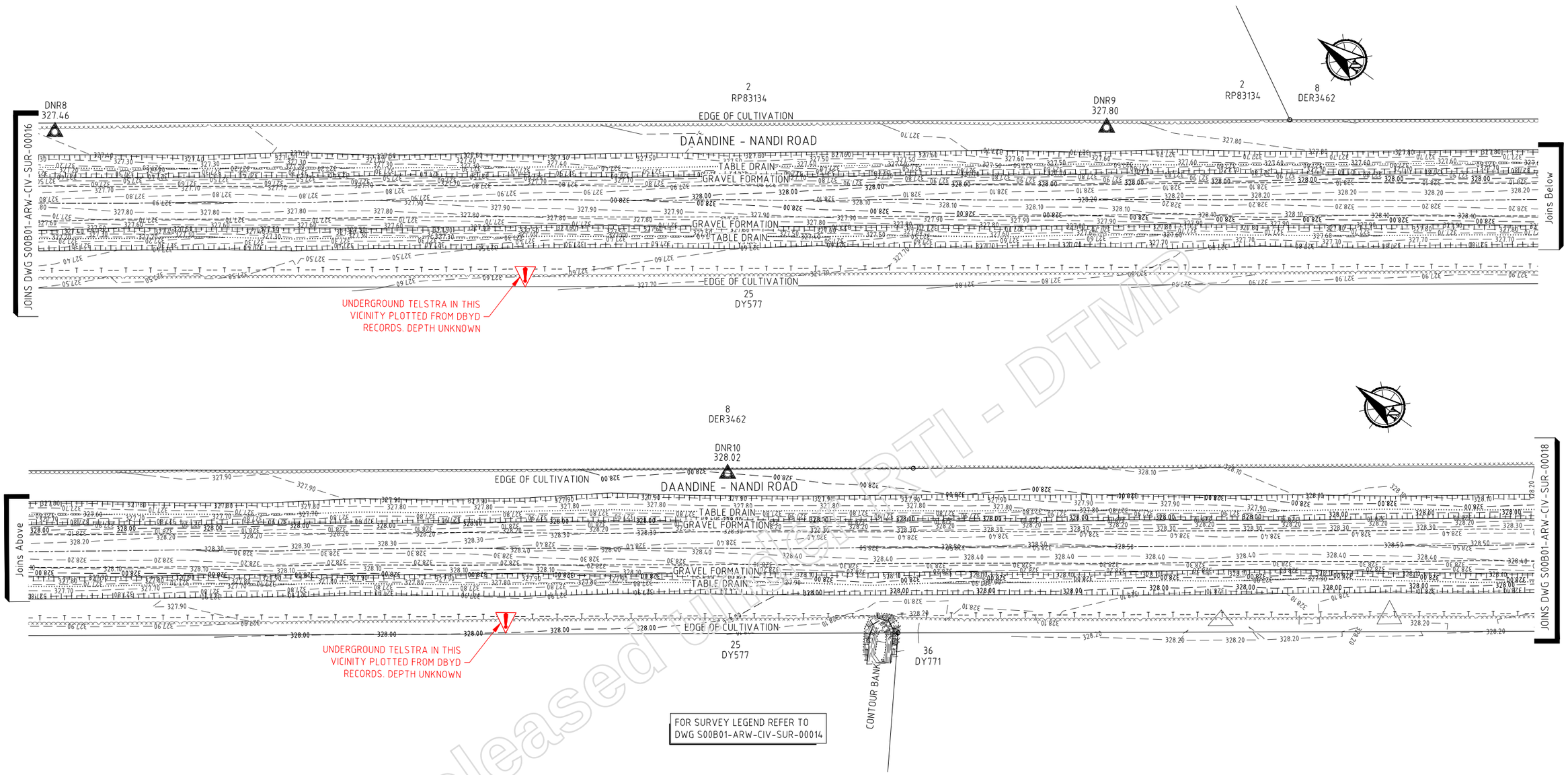
DRAWING No.: S00B01-ARW-CIV-SUR-00016

SCALE: 1:500m

REV: 1

A1

Released by ARTI - DTMR



The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

10 0 10 20 30 40 50m

SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-SUR-00018	SURVEY SHEET 5 OF 6	1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-SUR-00016	SURVEY SHEET 3 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION NR

STATUS ASB

brandon & associates ENGINEERING CONSULTANTS personal professional practical

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CONTRACTOR DWG No. 201237 C104

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 SURVEY SHEET 4 OF 6

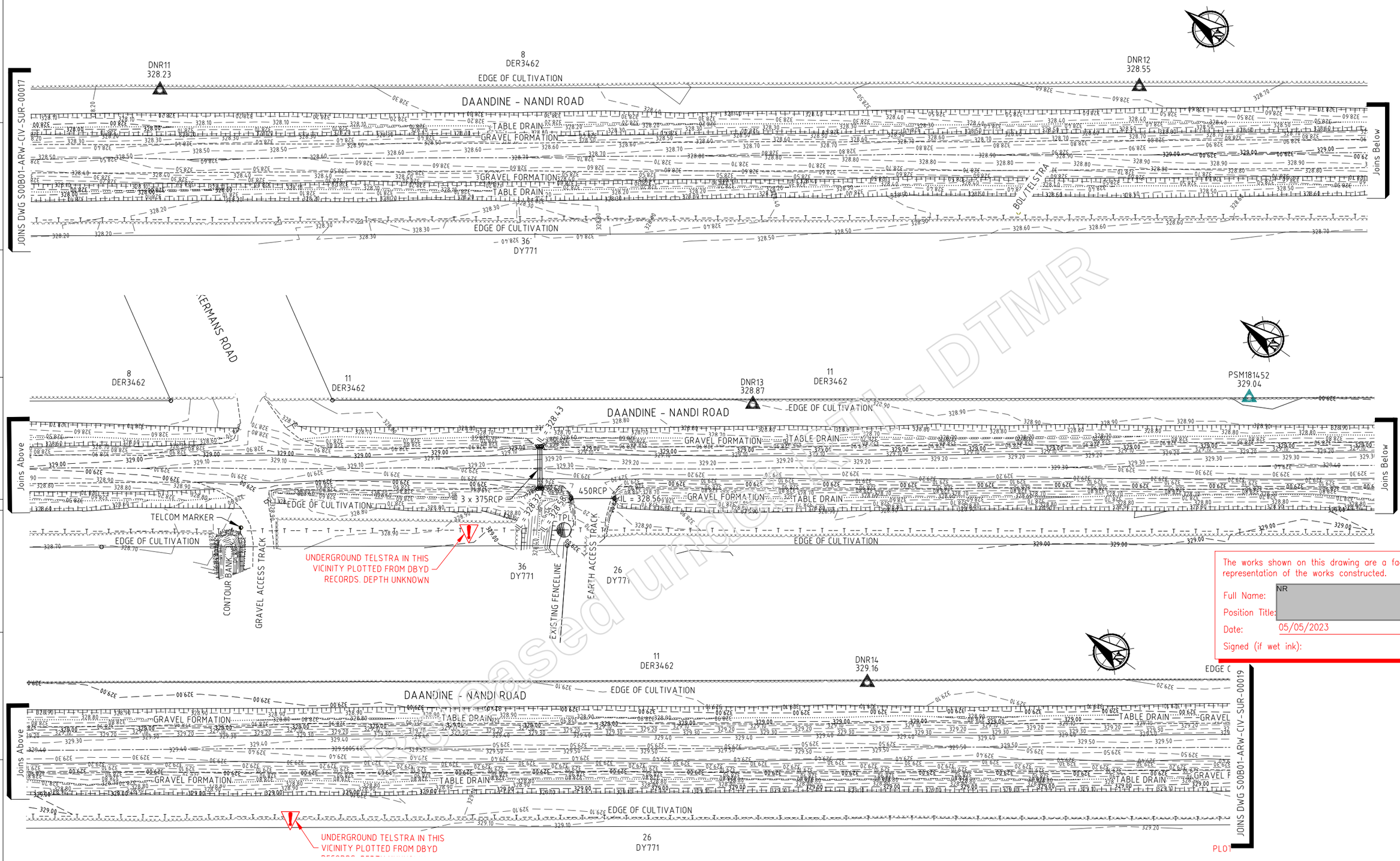
DRAWING No. S00B01-ARW-CIV-SUR-00017

SCALE 1:500m

REV 1

A1

Released under RTI - DTMR



The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

FOR SURVEY LEGEND REFER TO DWG S00B01-ARW-CIV-SUR-00014

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-SUR-00019	SURVEY SHEET 6 OF 6	1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-SUR-00017	SURVEY SHEET 4 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

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STATUS ASB

CONTRACTOR DWG No. 201237 C105

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

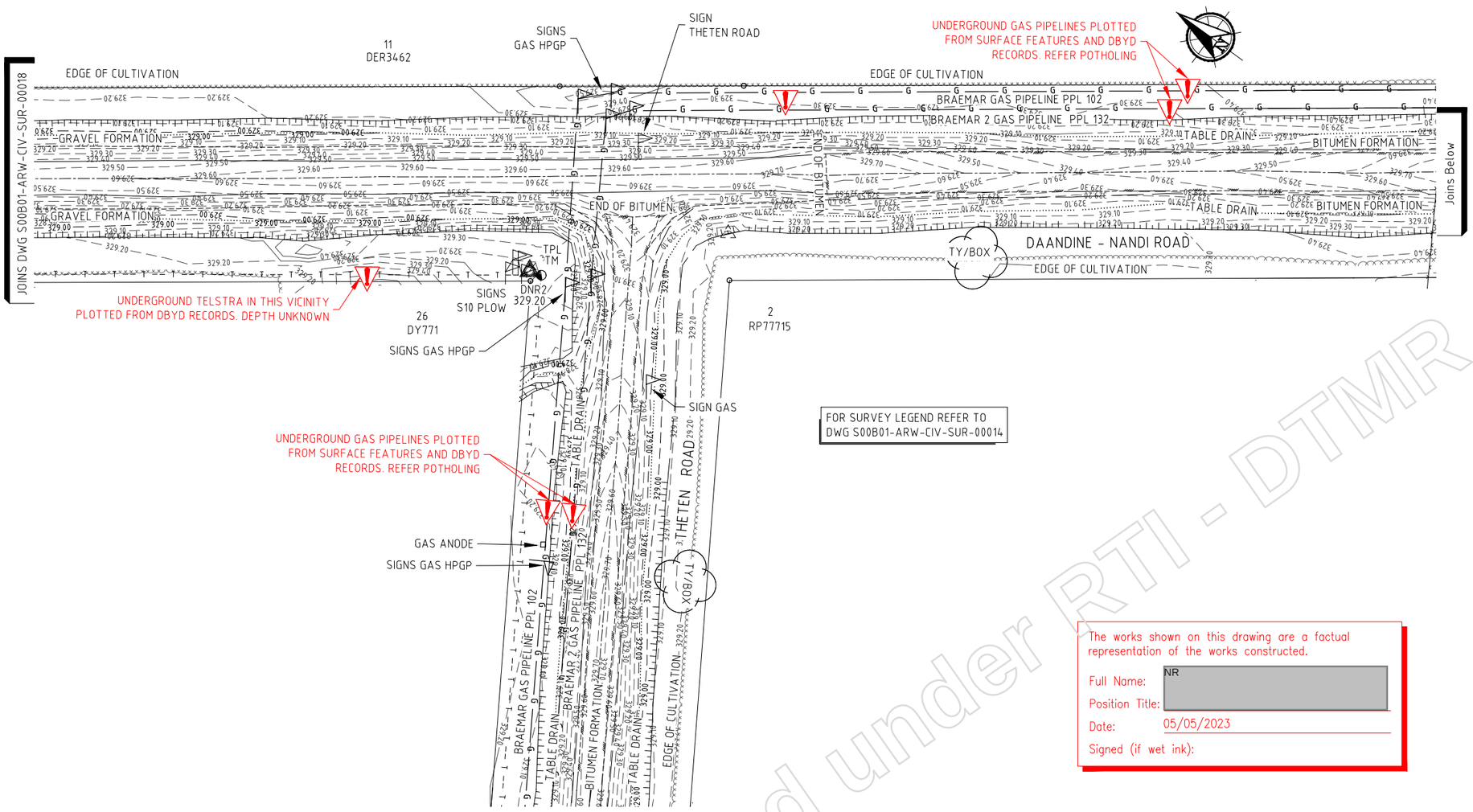
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 5 OF 6

DRAWING No. S00B01-ARW-CIV-SUR-00018

SCALE 1:500m

REV 1

A1



The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

Released under RTI - DTMR

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-SUR-00018	SURVEY SHEET 5 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

STATUS ASB

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C106

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
SURVEY SHEET 6 OF 6

DRAWING No. S00B01-ARW-CIV-SUR-00019

SCALE 1:500m

REV 1

A1

ALL SIGNAGE & PAVEMENT MARKING SHALL BE IN ACCORDANCE WITH THE CURRENT "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES"

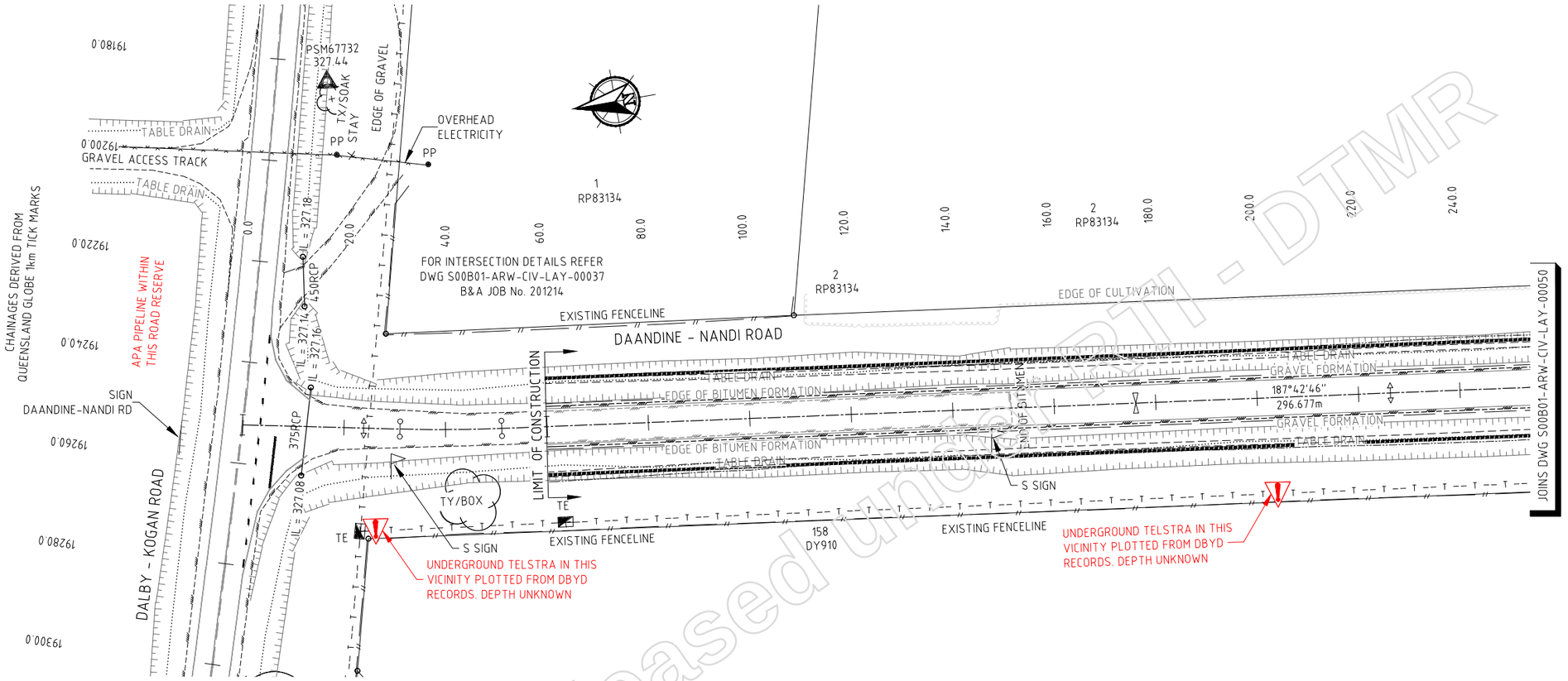
FOR SURVEY LEGEND REFER TO DWG S00B01-ARW-CIV-SUR-00014

FOR TYPE CROSS SECTIONS REFER DWG S00B01-ARW-CIV-DET-00057

CLEAR ZONES SHALL BE FREE OF NON-FRANGIBLE OBJECTS. REFER ROAD LANDSCAPE MANUAL PART C CHAPTER 5 - SAFETY PAR. 5.6.1

LEGEND

SYMBOL	DESCRIPTION
301.00	DESIGN CONTOUR MAJOR 1.0m
	DESIGN CONTROL LINE ROAD
	DESIGN CONTROL LINE ROAD TURNING POINT
	DESIGN CONTROL LINE ROAD CREST
	DESIGN CONTROL LINE ROAD SAG
	DESIGN ROAD EDGE OF BITUMEN
	DESIGN EDGE OF GRAVEL SHOULDER
	DESIGN DRAIN
	DESIGN INTERFACE
	CLEAR ZONE



10 0 10 20 30 40 50m
SCALE 1:500 (A1)

REFER TO VAR21 AND 61 - UNSUITABLE SUBGRADE TREATMENT AREAS

SITE INSTRUCTIONS	AREA	LOCATION	START CHAINAGE APPROX	FINISH CHAINAGE APPROX
SI 17388	1A	LHS	60	400
SI 18807	1B	RHS	1210	1400
SI 18809	1B	RHS	720	910
SI 34813	1B	CULVERT	955	-
SI 34820	1B	RHS	970	1050
SI 34828	1B	RHS	890	915
SI 34828	1B	RHS	920	925
SI 34828	1B	RHS	930	950
SI 34828	1B	RHS	955	990
SI 34828	1B	RHS	990	1000
SI 34828	1B	RHS	1020	1026
SI 34857	1B	RHS	1021	1099
SI 34858	1B	LHS	1222	1287
SI 34919	1C	CULVERT	1530	-
SI 18803	1D	RHS	3430	3468
SI 27980	1D	LHS	3480	3580
SI 27980	1D	LHS	3480	3580
SI 34804	1D	RHS	3460	3596
SI 34805	1D	SKERMAN ROAD	2730	2744
SI 34824	1D	RHS	2865	3435
SI 34856	1D	CULVERT	2795	2810

TABLE DRAINS AND DIVERSION DRAINS

TABLE DRAINS AND FLAT BOTTOMED DIVERSION DRAINS SHALL BE INCORPORATED WHERE PRACTICAL IN THE VERGE ALONG BOTH SIDES OF THE ROAD. REFER DEPARTMENT OF MAIN ROADS STD. DWG. 1178

UNLESS SPECIFIED OTHERWISE, DIVERSION DRAINS SHALL BE SPACED AS FOLLOWS:-

LONGITUDINAL GRADIENTS UP TO 2%	120 m
LONGITUDINAL GRADIENTS 2% TO 4%	60 m
LONGITUDINAL GRADIENTS 4% TO 8%	30 m
LONGITUDINAL GRADIENTS GREATER THAN 8%	15 m

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

Released under RTI - DTMR

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REF DOC No.	REFERENCE DRAWING TITLE	REV.	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C110

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

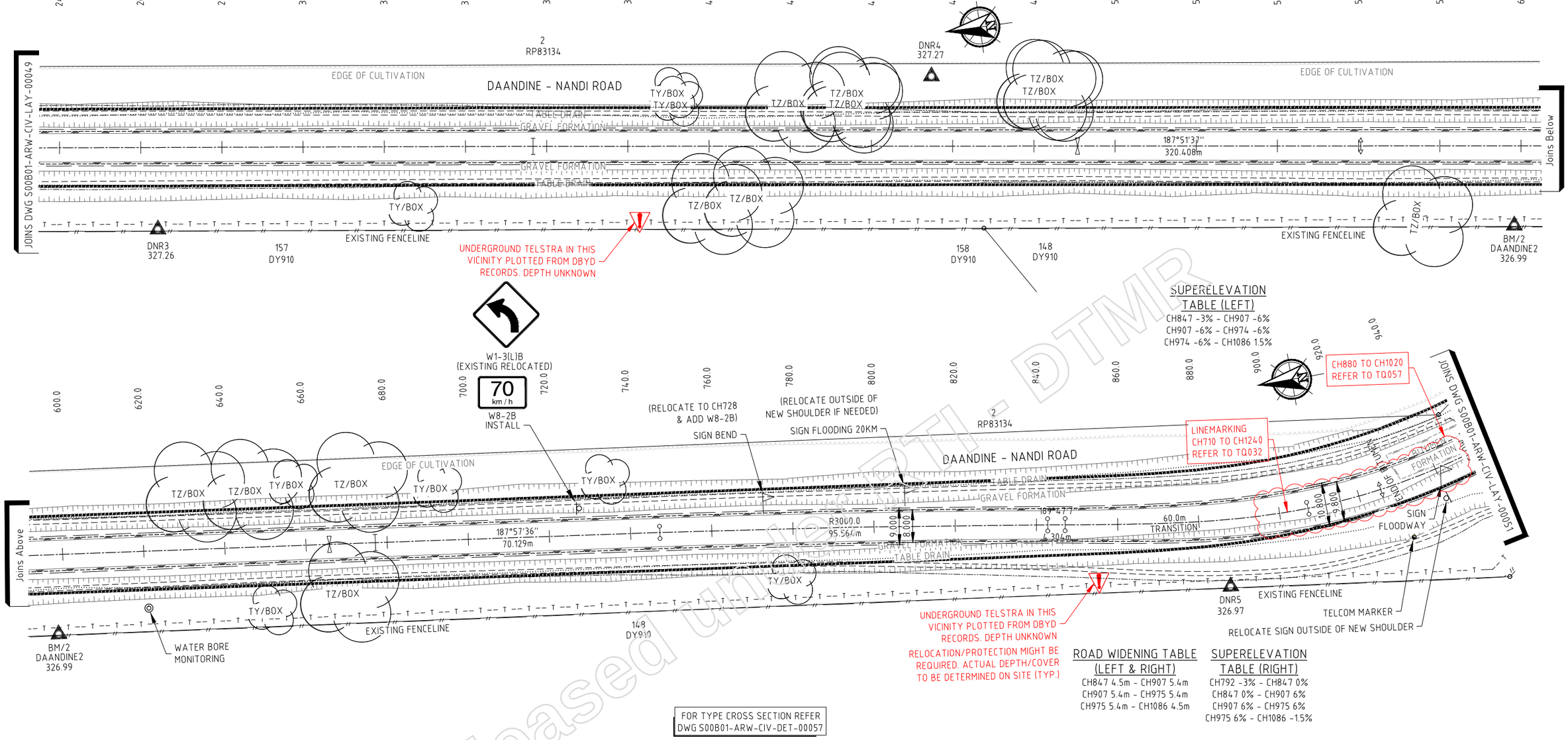
SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 LAYOUT SHEET 1 OF 6

DRAWING No. S00B01-ARW-CIV-LAY-00049

SCALE 1:500m

REV 1

A1



SUPERELEVATION TABLE (LEFT)

CH847 -3% - CH907 -6%
CH907 -6% - CH974 -6%
CH974 -6% - CH1086 1.5%

ROAD WIDENING TABLE (LEFT & RIGHT)

CH847 4.5m - CH907 5.4m
CH907 5.4m - CH975 5.4m
CH975 5.4m - CH1086 4.5m

SUPERELEVATION TABLE (RIGHT)

CH792 -3% - CH847 0%
CH847 0% - CH907 6%
CH907 6% - CH975 6%
CH975 6% - CH1086 -1.5%

FOR TYPE CROSS SECTION REFER
DWG S00B01-ARW-CIV-DET-00057

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	DRIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C111

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

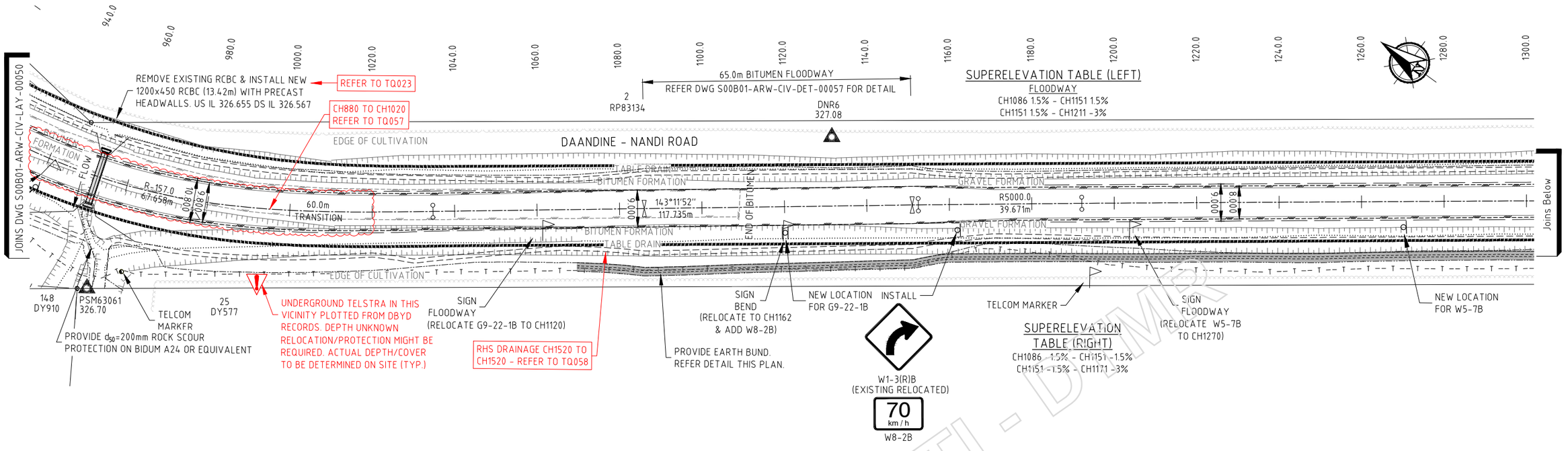
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 2 OF 6

DRAWING No. S00B01-ARW-CIV-LAY-00050

SCALE 1:500m

REV 1

A1



The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

10 0 10 20 30 40 50m

SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		4	05.05.23	AS BUILT	JAG	PN	PML	SW
		3	05.10.22	ISSUE FOR CONSTRUCTION	JAG	PRH	PML	PML
		2	08.09.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6	1	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C112

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 LAYOUT SHEET 3 OF 6

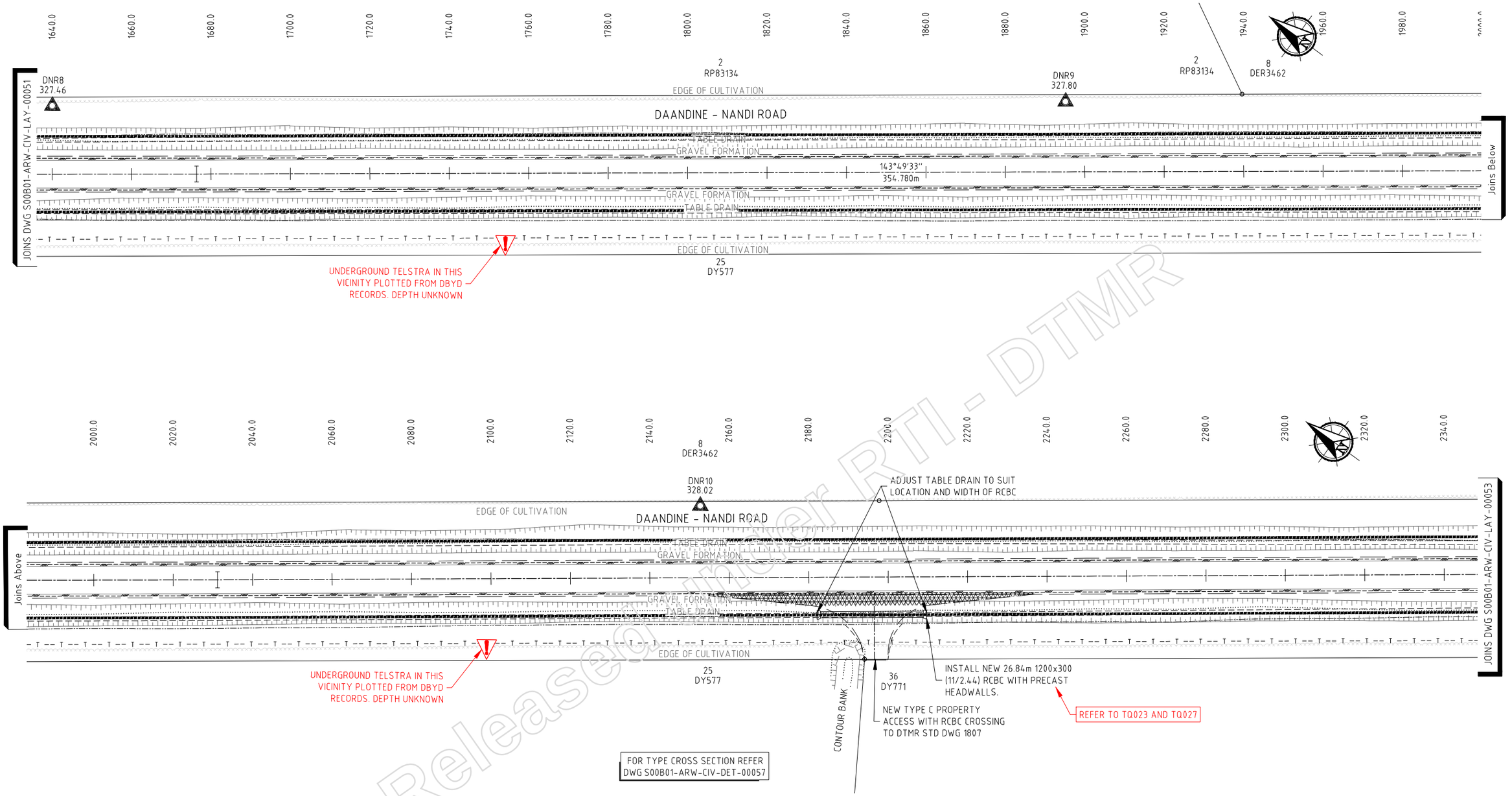
DRAWING No. S00B01-ARW-CIV-LAY-00051

SCALE 1:500m

REV 4

A1

Released under RTI - DTMR



Released under RTI - DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	1	05.10.22	ISSUE FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

STATUS ASB

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C113

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

DRAWING No. S00B01-ARW-CIV-LAY-00052

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 4 OF 6

SCALE 1:500m | REV 2 | A1

DNR11
328.23

8
DER3462

EDGE OF CULTIVATION

DNR12
328.55

DAANDINE - NANDI ROAD

GRAVEL FORMATION

143°43'36"
683.154m

TABLE DRAIN

BOLT TELSTRA

JOINS DWG S00B01-ARW-CIV-LAY-00052

Joins Below

36
DY771

CONSTRUCT NEW TYPE C PROPERTY ACCESS TO DTMR STD DWG 1807. INSTALL NEW Ø450 RCP WITH PRECAST SLOPING HEADWALLS (24m) US IL 328.385 DS IL 328.328.357

REFER TO TQ023 AND TQ027

SKERMANS ROAD

SKERMANS RD
G3-5
INSTALL

8
DER3462

11
DER3462

REMOVE EXISTING 3xØ375 RCP'S & INSTALL NEW 1200x450 RCBC (14.64m) WITH PRECAST HEADWALLS. US IL 328.427 DS IL 328.326

REFER TO TQ023 AND TQ027

11
DER3462

DNR13
328.87

PSM181452
329.04

DAANDINE - NANDI ROAD

EDGE OF CULTIVATION

Joins Above

GRAVEL FORMATION

TABLE DRAIN

144°3'21"
147.073m

FLOW

Joins Below

EDGE OF CULTIVATION

TELCOM MARKER

EDGE OF CULTIVATION

UNDERGROUND TELSTRA IN THIS VICINITY PLOTTED FROM DBYD RECORDS. DEPTH UNKNOWN

TELSTRA LINE DEPTH 0.60m BELOW EXISTING NATURAL SURFACE. RL328.174

CONTOUR BANK

GRAVEL ACCESS TRACK

36
DY771

EXISTING FENCELINE

EARTH ACCESS TRACK

26
DY771

EXISTING TELSTRA PILLAR

CONSTRUCT NEW TYPE A PROPERTY ACCESS TO DTMR STD DWG 1807. REMOVE EXISTING Ø450 RCP AND RE-LAY. INSTALL PRECAST SLOPING HEADWALLS (12m) US IL 328.341 DS IL 328.333

REFER TO TQ023 AND TQ027

REFER TO TQ023 AND TQ027

CONSTRUCT NEW TYPE C PROPERTY ACCESS TO DTMR STD DWG 1807. INSTALL NEW Ø450 RCP WITH PRECAST SLOPING HEADWALLS (OPTIONAL) (18.0m) US IL 328.314 DS IL 328.291

REFER TO TQ043 CHANGE TO INSITU HEADWALL

W2-4(R)B
INSTALL

11
DER3462

DNR14
329.16

DAANDINE - NANDI ROAD

EDGE OF CULTIVATION

Joins Above

GRAVEL FORMATION

TABLE DRAIN

143°43'54"
433.424m

144°
94.1

JOINS DWG S00B01-ARW-CIV-LAY-00054

EDGE OF CULTIVATION

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

UNDERGROUND TELSTRA IN THIS VICINITY PLOTTED FROM DBYD RECORDS. DEPTH UNKNOWN

26
DY771

FOR TYPE CROSS SECTION REFER DWG S00B01-ARW-CIV-DET-00057

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

STATUS ASB

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

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CONTRACTOR DWG No. 201237 C114

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

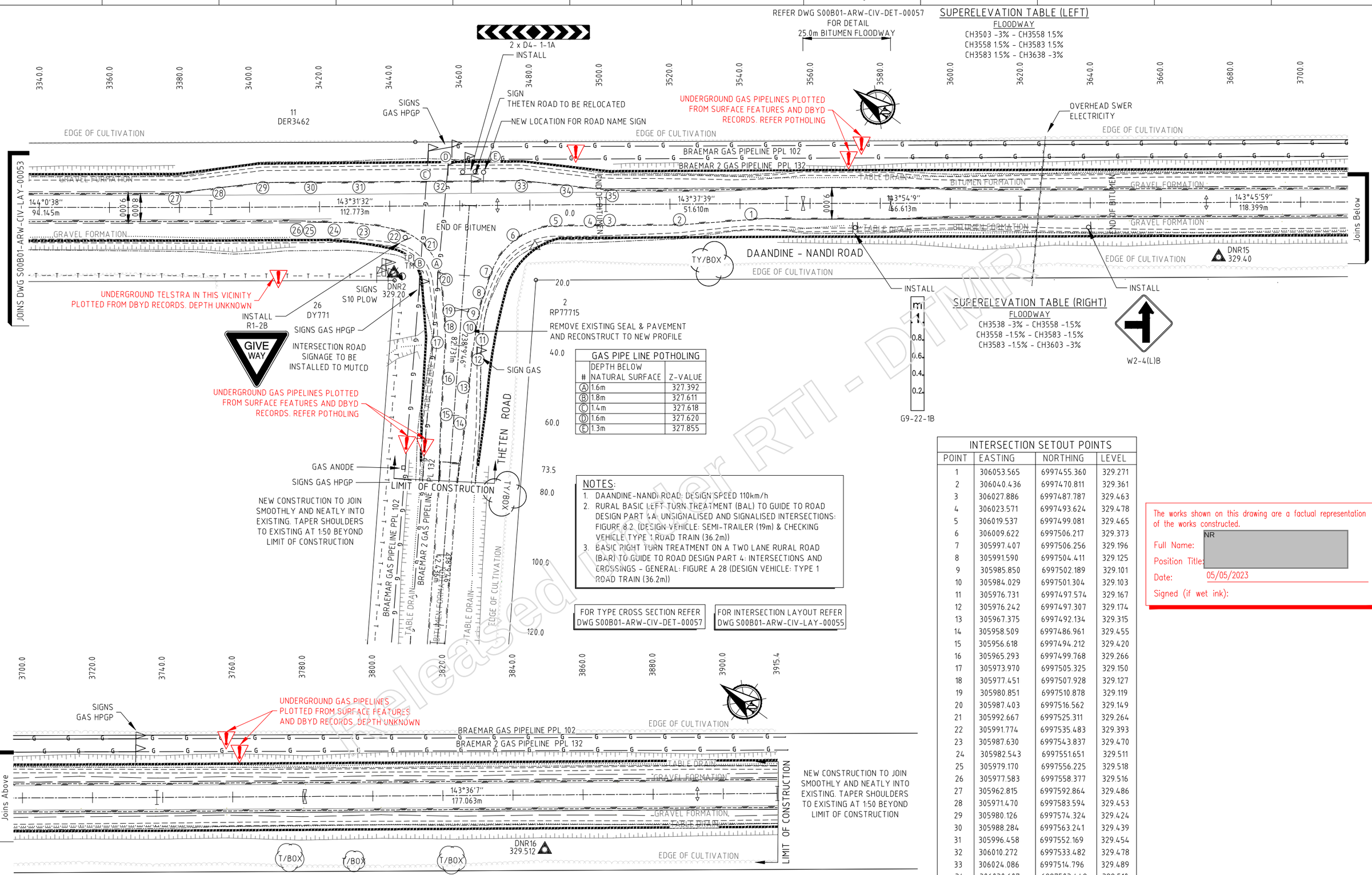
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 5 OF 6

DRAWING No. S00B01-ARW-CIV-LAY-00053

SCALE 1:500m

REV 2

A1



SUPERELEVATION TABLE (LEFT)

FLOODWAY
CH3503 -3% - CH3558 1.5%
CH3558 1.5% - CH3583 1.5%
CH3583 1.5% - CH3638 -3%

SUPERELEVATION TABLE (RIGHT)

FLOODWAY
CH3538 -3% - CH3558 -1.5%
CH3558 -1.5% - CH3583 -1.5%
CH3583 -1.5% - CH3603 -3%

GAS PIPE LINE POTHOLING

#	DEPTH BELOW NATURAL SURFACE	Z-VALUE
A	1.6m	327.392
B	1.8m	327.611
C	1.4m	327.618
D	1.6m	327.620
E	1.3m	327.855

NOTES:

1. DAANDINE-NANDI ROAD: DESIGN SPEED 110km/h
2. RURAL BASIC LEFT TURN TREATMENT (BAL) TO GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS: FIGURE 8.2 (DESIGN VEHICLE: SEMI-TRAILER (19m) & CHECKING VEHICLE TYPE 1 ROAD TRAIN (36.2m))
3. BASIC RIGHT TURN TREATMENT ON A TWO LANE RURAL ROAD (BAR) TO GUIDE TO ROAD DESIGN PART 4: INTERSECTIONS AND CROSSINGS - GENERAL: FIGURE A 28 (DESIGN VEHICLE: TYPE 1 ROAD TRAIN (36.2m))

FOR TYPE CROSS SECTION REFER DWG S00B01-ARW-CIV-DET-00057

FOR INTERSECTION LAYOUT REFER DWG S00B01-ARW-CIV-LAY-00055

INTERSECTION SETOUT POINTS

POINT	EASTING	NORTHING	LEVEL
1	306053.565	6997455.360	329.271
2	306040.436	6997470.811	329.361
3	306027.886	6997487.787	329.463
4	306023.571	6997493.624	329.478
5	306019.537	6997499.081	329.465
6	306009.622	6997506.217	329.373
7	305997.407	6997506.256	329.196
8	305991.590	6997504.411	329.125
9	305985.850	6997502.189	329.101
10	305984.029	6997501.304	329.103
11	305976.731	6997497.574	329.167
12	305976.242	6997497.307	329.174
13	305967.375	6997492.134	329.315
14	305958.509	6997486.961	329.455
15	305956.618	6997494.212	329.420
16	305965.293	6997499.768	329.266
17	305973.970	6997505.325	329.150
18	305977.451	6997507.928	329.127
19	305980.851	6997510.878	329.119
20	305987.403	6997516.562	329.149
21	305992.667	6997525.311	329.264
22	305991.774	6997535.483	329.393
23	305987.630	6997543.837	329.470
24	305982.543	6997551.651	329.511
25	305979.170	6997556.225	329.518
26	305977.583	6997558.377	329.516
27	305962.815	6997592.864	329.486
28	305971.470	6997583.594	329.453
29	305980.126	6997574.324	329.424
30	305988.284	6997563.241	329.439
31	305996.458	6997552.169	329.454
32	306010.272	6997533.482	329.478
33	306024.086	6997514.796	329.489
34	306030.607	6997503.449	329.510
35	306037.126	6997492.104	329.516

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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		1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

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STATUS ASB

CONTRACTOR DWG No. 201237 C115

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

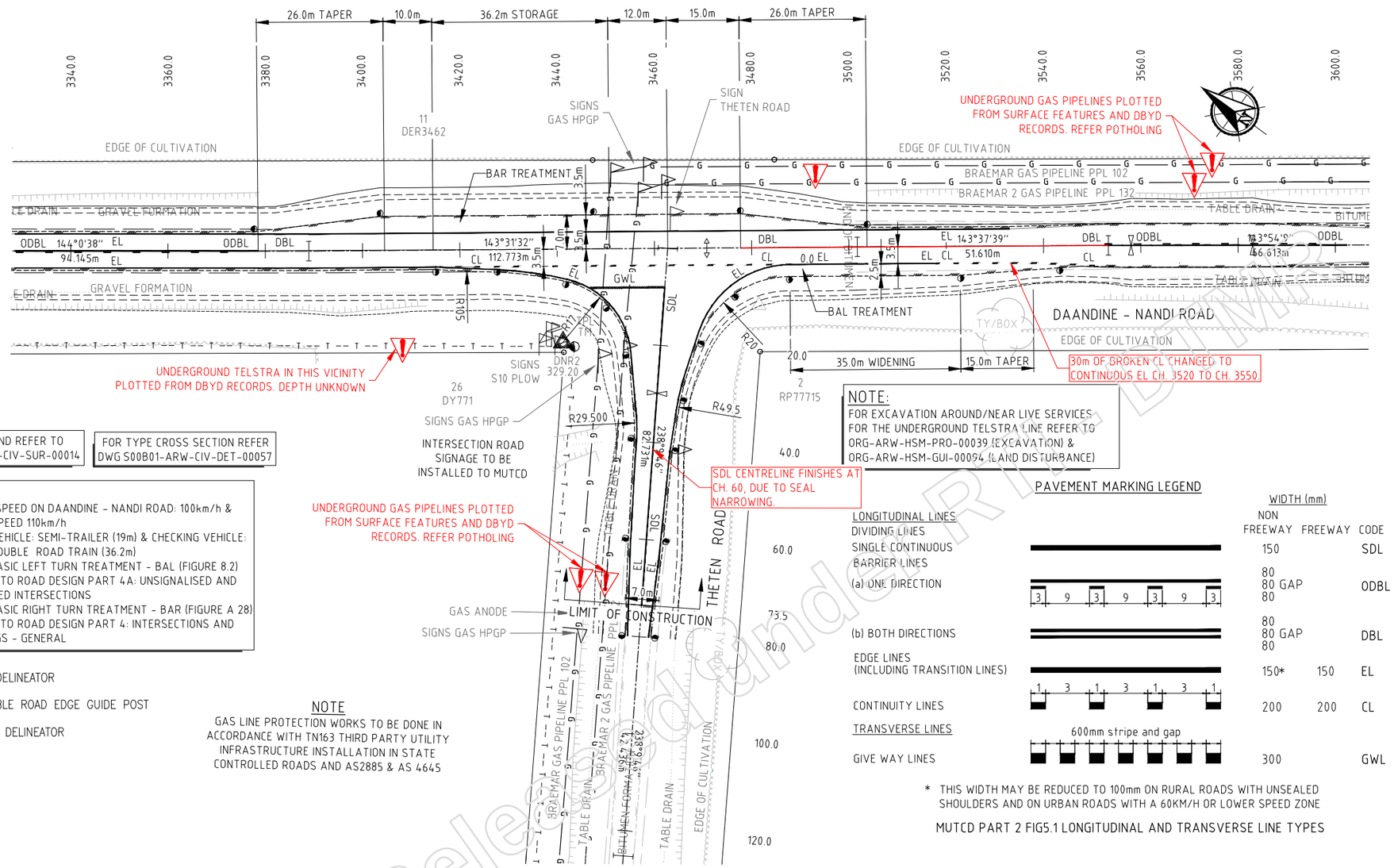
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 6 OF 6

DRAWING No. S00B01-ARW-CIV-LAY-00054

SCALE 1:500m

REV 1

A1



INTERSECTION SETOUT POINTS			
POINT	EASTING	NORTHING	LEVEL
1	306053.565	6997455.360	329.271
2	306040.436	6997470.811	329.361
3	306027.887	6997487.787	329.464
4	306019.534	6997499.083	329.505
5	306011.034	6997510.579	329.432
6	305997.407	6997506.256	329.204
7	305991.590	6997504.411	329.132
8	305987.681	6997503.171	329.109
9	305984.029	6997501.305	329.108
10	305976.731	6997497.574	329.167
11	305976.483	6997497.447	329.171
12	305976.242	6997497.307	329.175
13	305958.507	6997486.960	329.451
14	305956.617	6997494.212	329.412
15	305973.970	6997505.325	329.159
16	305975.805	6997506.500	329.149
17	305977.451	6997507.928	329.144
18	305987.403	6997516.562	329.210
19	305996.476	6997524.434	329.357
20	305991.772	6997535.487	329.465
21	305988.087	6997544.147	329.515
22	305982.491	6997551.716	329.520
23	305977.544	6997558.408	329.551
24	305962.815	6997592.864	329.486
25	305971.470	6997583.594	329.453
26	305980.126	6997574.324	329.424
27	305988.284	6997563.241	329.439
28	305996.458	6997552.169	329.454
29	306010.272	6997533.482	329.478
30	306024.086	6997514.796	329.489
31	306030.607	6997503.449	329.510
32	306037.126	6997492.104	329.516

FOR SURVEY LEGEND REFER TO DWG S00B01-ARW-CIV-SUR-00014

FOR TYPE CROSS SECTION REFER DWG S00B01-ARW-CIV-DET-00057

NOTE:
FOR EXCAVATION AROUND/NEAR LIVE SERVICES FOR THE UNDERGROUND TELSTRA LINE REFER TO ORG-ARW-HSM-PRO-00039 (EXCAVATION) & ORG-ARW-HSM-GUI-00094 (LAND DISTURBANCE)

NOTES:
1. POSTED SPEED ON DAANDINE - NANDI ROAD: 100km/h & DESIGN SPEED 110km/h
2. DESIGN VEHICLE: SEMI-TRAILER (19m) & CHECKING VEHICLE: TYPE 1 DOUBLE ROAD TRAIN (36.2m)
3. RURAL BASIC LEFT TURN TREATMENT - BAL (FIGURE 8.2) OF GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS
4. RURAL BASIC RIGHT TURN TREATMENT - BAR (FIGURE A 28) OF GUIDE TO ROAD DESIGN PART 4: INTERSECTIONS AND CROSSINGS - GENERAL

RED DELINEATOR
FLEXIBLE ROAD EDGE GUIDE POST
WHITE DELINEATOR

NOTE
GAS LINE PROTECTION WORKS TO BE DONE IN ACCORDANCE WITH TN163 THIRD PARTY UTILITY INFRASTRUCTURE INSTALLATION IN STATE CONTROLLED ROADS AND AS2885 & AS 4645

PAVEMENT MARKING LEGEND

		WIDTH (mm) NON FREEWAY	WIDTH (mm) FREEWAY	CODE
LONGITUDINAL LINES				
DIVIDING LINES				
SINGLE CONTINUOUS BARRIER LINES		150		SDL
(a) ONE DIRECTION	3 9 3 9 3 9 3	80 80 GAP 80		ODBL
(b) BOTH DIRECTIONS		80 80 GAP 80		DBL
EDGE LINES (INCLUDING TRANSITION LINES)		150*	150	EL
CONTINUITY LINES	1 3 1 3 1 3 1	200	200	CL
TRANSVERSE LINES	600mm stripe and gap			
GIVE WAY LINES		300		GWL

* THIS WIDTH MAY BE REDUCED TO 100mm ON RURAL ROADS WITH UNSEALED SHOULDERS AND ON URBAN ROADS WITH A 60KM/H OR LOWER SPEED ZONE

MUTCD PART 2 FIG5.1 LONGITUDINAL AND TRANSVERSE LINE TYPES

FOR BENCHMARK SITE-COORDINATES, DATUM AND OTHER SURVEY INFORMATION REFER TO DWG S00B01-ARW-CIV-SUR-00014

The works shown on this drawing are a factual representation of the works constructed.
Full Name: NR
Position Title:
Date: 05/05/2023
Signed (if wet ink):

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

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S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

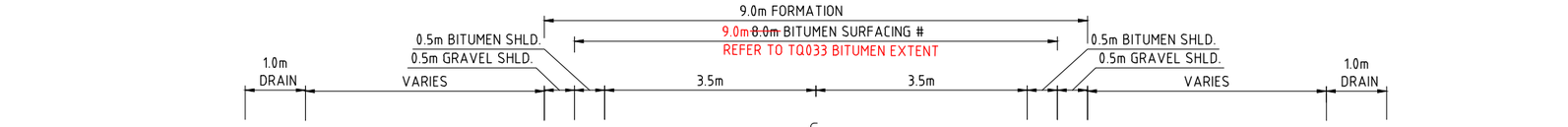
RPEQ CERTIFICATION
NR

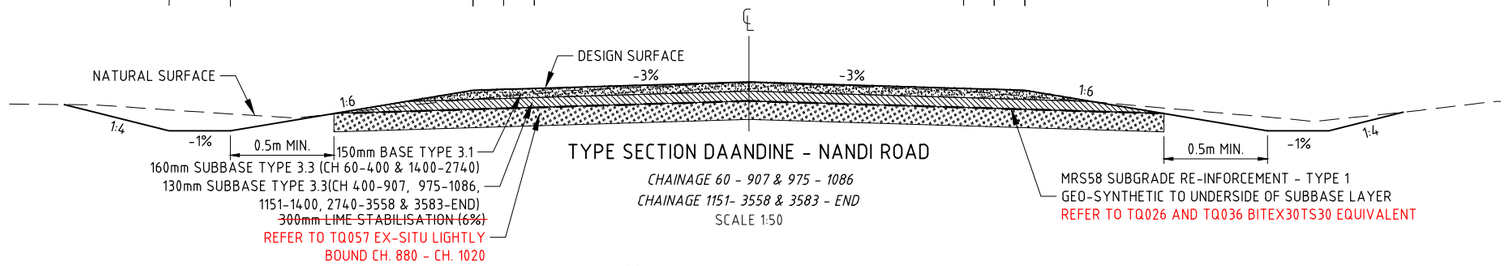
brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical
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SITE	S00
PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED
STATUS	ASB
CONTRACTOR DWG No.	201237 C116
DRAWING No.	S00B01-ARW-CIV-LAY-00055
SCALE	1:500m
REV	2
	A1

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
THETEN ROAD INTERSECTION LAYOUT

Released under ARTC



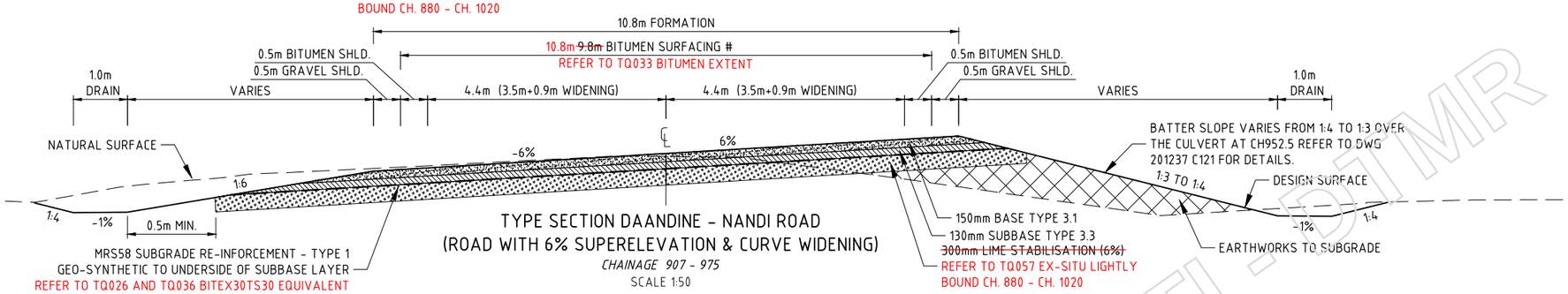


TYPE SECTION DAANDINE - NANDI ROAD

CHAINAGE 60 - 907 & 975 - 1086

CHAINAGE 1151- 3558 & 3583 - END

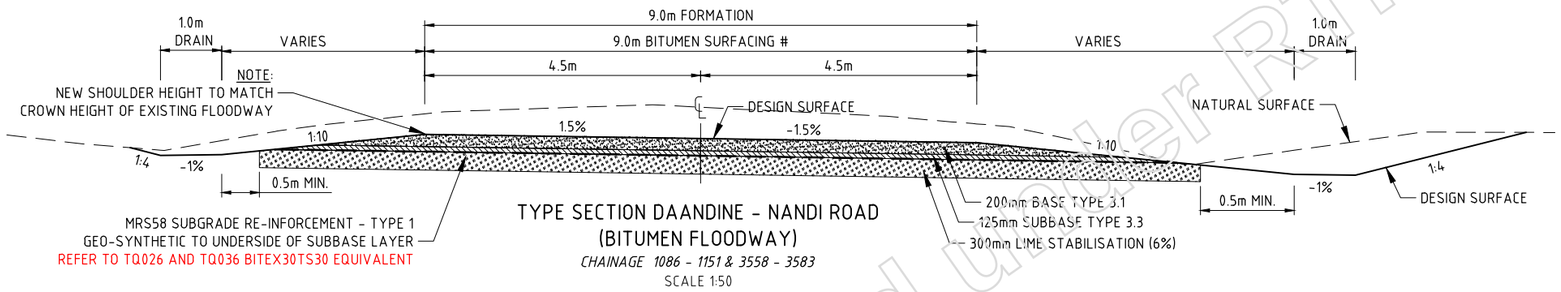
SCALE 1:50



TYPE SECTION DAANDINE - NANDI ROAD
(ROAD WITH 6% SUPERELEVATION & CURVE WIDENING)

CHAINAGE 907 - 975

SCALE 1:50



TYPE SECTION DAANDINE - NANDI ROAD
(BITUMEN FLOODWAY)

CHAINAGE 1086 - 1151 & 3558 - 3583

SCALE 1:50

DESIGN TRAFFIC DATA

AADT (2019) 72 VPD
% COMMERCIAL VEHICLES = 25%
% COMMERCIAL VEHICLE GROWTH RATE = 2%
DESIGN LIFE = 20YEARS
DESA = $3.65X10^5$
SUBGRADE CBR 1.5% SOAKED

#BITUMEN SURFACING:

REFER TO TQ040, ATP24 AND ATP032 SEAL DESIGN
ECOPRIME @ 1 L/M2 OR AMC00 @ 0.9 L/M2
SEAL COAT A S45R @ 1.2 L/M2 + 14mm AGG @ 100 M2/M3
SEAL COAT B S45R @ 1 L/M2 + 10mm AGG @ 185 M2/M3

DESIGN CRITERIA:

1. POSTED SPEED 100km\h DESIGN SPEED 110km\h
2. CLEAR ZONE DISTANCES FROM EDGE OF THROUGH TRAVELLED WAY GUIDE TO ROAD DESIGN - PART 6 TABLE 4.1: CUT - 5m FILL - 8m
3. RECOMMENDED SIDE FRICTION FACTORS FOR CARS AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.5: DESIRED MAXIMUM - 0.12 ABSOLUTE MAXIMUM - 0.12
4. MINIMUM RADIUS VALUES AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.6: 667m / 6% SUPERELEVATION
5. DESIGN SUPERELEVATION DEVELOPMENT LENGTHS AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.11: 110m
6. MINIMUM RADIUS WITH ADVERSE CROSSFALL AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.12: 2700m
7. CURVE WIDENING - AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 7.13 A-DOUBLE TYPE 1 ROAD TRAIN (36.2m) = 0.9m PER LANE
8. MINIMUM SIZE CREST VERTICAL CURVE FOR SEALED ROADS BASED ON STOPPING SIGHT DISTANCE FOR A CAR AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN TABLE 8.7: DESIRABLE MINIMUM VALUE R_T - 2.0s = K VALUE 83.6m & ABSOLUTE MINIMUM VALUE R_T - 2.0s = K VALUE 60.6m
9. MINIMUM SIZE SAG VERTICAL CURVE FOR RURAL ROADS (COMFORT CRITERIA GOVERN) AUSTROADS GUIDE TO ROAD DESIGN PART 3: GEOMETRIC DESIGN
   FIG 8.9: K VALUE 19 - 31m

POSITIONS OF SERVICES SHOWN ARE GIVEN FOR GUIDANCE ONLY. LOCATIONS AND/OR DEPTHS MAY NOT BE ACCURATELY REPRESENTED AND OTHER SERVICES MAY EXIST ON SITE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT A DIAL BEFORE YOU DIG ENQUIRY AND TO VERIFY THE POSITION OF ALL SERVICES ON SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

SPACING OF GUIDE POSTS ON CURVES

CURVE RADIUS (m)	SPACING (m)	
	ON OUTSIDE OF CURVE	ON INSIDE OF CURVE
< 100	6	12
100 - 199	10	20
200 - 299	15	30
300 - 399	20	40
400 - 599	30	60
600 - 799	40	60
800 - 1199	60	60
1200 - 2000	90	90
> 2000	150	150

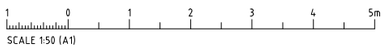
EACH POST ON THE INSIDE OF A CURVE SHALL BE PLACED OPPOSITE A POST ON THE OUTSIDE OF THE CURVE WHEREVER PRACTICABLE

GUIDE POST NOTES:

REFER TO TQ028 GUIDE POST SPACING

GUIDE POSTS ARE TO BE INSTALLED THE LENGTH OF BOTH SIDES OF THE ROAD TO MARK THE EDGE OF ROAD FORMATION.

1. ON STRAIGHTS SECTIONS - THE NOMINAL SPACING OF GUIDE POSTS SHALL BE 150m, WITH POSTS IN PAIRS, ONE EACH SIDE OF THE ROAD FORMATION
2. ON CURVES - REFER TO TABLE FOR GUIDE POST SPACINGS
3. AT CRESTS - ON STRAIGHTS OR ON THE OUTSIDE CURVE AT LEAST 2 PAIRS OF GUIDE POSTS SHALL BE VISIBLE AT ALL TIMES TO THE DRIVER.
4. AT FLOODWAYS - THE MAXIMUM SPACING OF GUIDE POSTS SHALL BE 25m, WITH THE POSTS IN PAIRS, ONE EACH SIDE OF THE ROAD FORMATION OF THE FLOODWAY
5. AT CULVERTS - AT EACH CULVERT, TWO GUIDE POSTS SHALL BE INSTALLED, ONE AT EACH END OF THE HEADWALL. ADDITIONAL PAIRS OF GUIDE POST AT A MAXIMUM SPACING OF 10m SHALL BE USED IF THE SPACING BETWEEN THE GUIDE POSTS AT EACH END OF THE HEADWALL IS GREATER THAN 10m
6. AREAS SUBJECT TO FOG - NOMINAL SPACING OF GUIDE POSTS MAYBE REDUCED TO 60m ON STRAIGHTS OR CURVES IN AREAS SUBJECT TO FOG



SCALE 1:50 (A1)

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		4	05.05.23	AS BUILT	JAG	PN	PML	SW
		3	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		2	11.03.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-REP-00004	PAVEMENT DESIGN REPORT	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
TYPICAL SECTIONS AND DETAILS

STATUS ASB

CONTRACTOR DWG No. 201237 C120

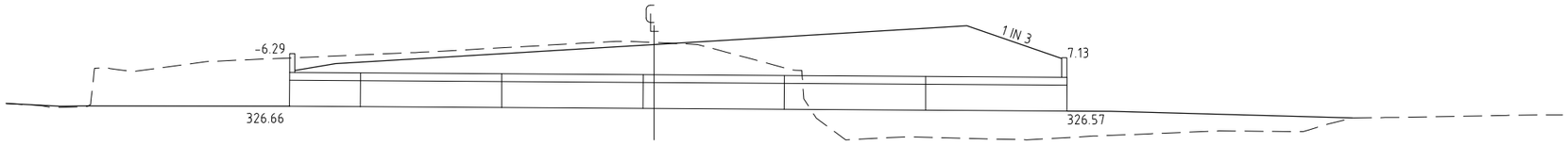
DRAWING No. S00B01-ARW-CIV-DET-00057

SCALE 1:50

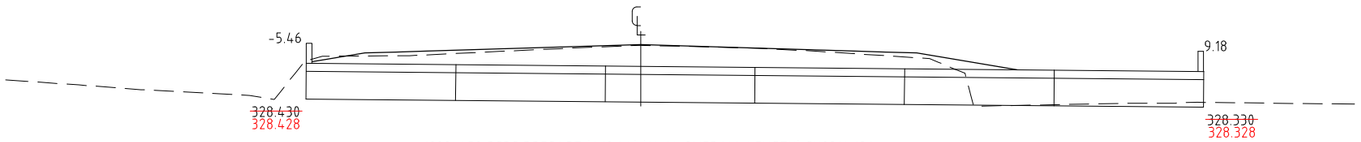
REV 4

A1

Released under RTI - DTMR



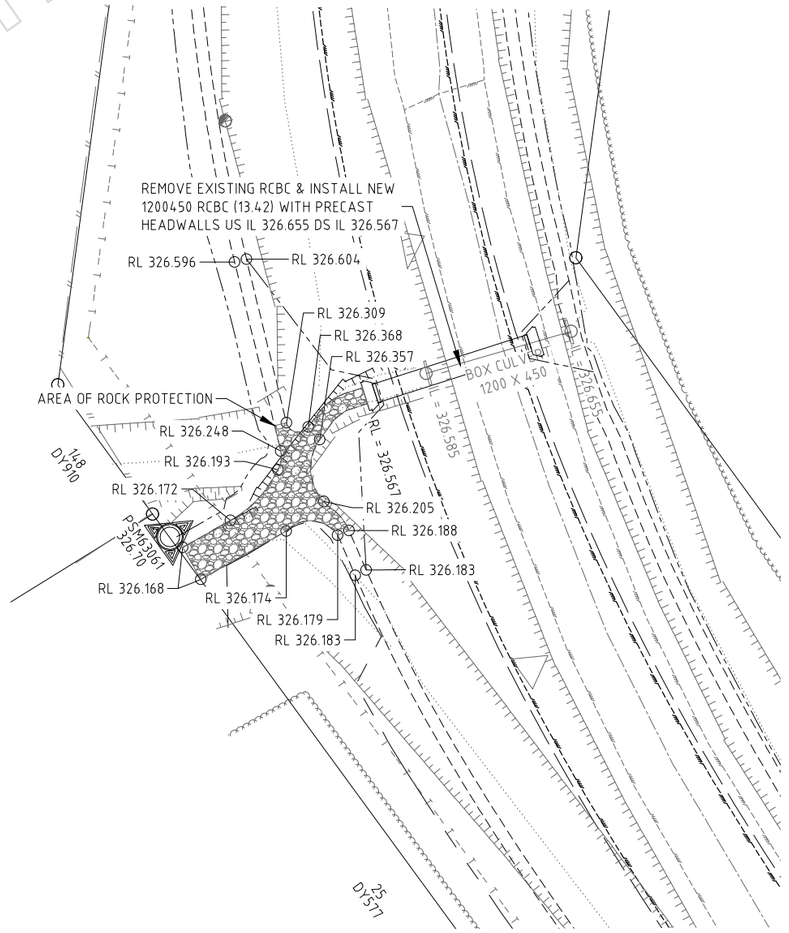
1200x450 RCBC PRECAST (1/1.22 AND 5/2.44) (13.42 OVERALL LENGTH) CH952.5
BASE SLAB CONC. 3.8m³
PRECAST ENDWALLS
C/O WALL CONC. 0.4m³, HEADWALL EXTENSION CONC. 0.4m³, 54 M12 ANCHOR BARS
STANDARD DRAWINGS - 1359, 1243/2
EXTERNAL BOX WD. 1440mm, INTERNAL HT. 450mm, DECK THICK. 175mm
LEG THICK. 108mm, HEADWALL HT. 325mm, BASESLAB THICK. 180mm



1200x450 RCBC PRECAST (6/2.44) (14.64 OVERALL LENGTH) CH2814.196
BASE SLAB CONC. 4.2m³
PRECAST ENDWALLS
C/O WALL CONC. 0.4m³, HEADWALL EXTENSION CONC. 0.4m³, 54 M12 ANCHOR BARS
STANDARD DRAWINGS - 1359, 1243/2
EXTERNAL BOX WD. 1440mm, INTERNAL HT. 450mm, DECK THICK. 175mm
LEG THICK. 108mm, HEADWALL HT. 325mm, BASESLAB THICK. 180mm

CROSS DRAINAGE QUANTITIES SCHEDULE

CULVERT CHAINAGE	DRAINAGE STRUCTURE	ENDWALLS / WINGWALLS (U)CONC. (m³)	(R)CONC. (m³)	REINFORCING (m²)	REINFORCING (MESH)	CONCRETE BASES CONC. (m³)	REINFORCING RL1218 (m²)	REINFORCING N12 (m)	REINFORCING NIBS (m)	CUT OFF WALLS (m³)	FILL / BACKFILL OLM (m³)	FBM (m³)	BHM (m³)	BSP (m³)	NO FINES CONC. BLOCK	REQ. BAR MASS (kg)	OLM = OVERLAY MATERIAL FBM = FILL / BACKFILL /SIDE MATERIAL BHM = BEDDING / HAUNCH MATERIAL BSP = BEDDING STEEL PIPES REMARKS
952.50	1200x450 RCBC PRECAST (1/1.22 & 5/2.44)	0.4				3.8	21.3	107.0		0.4			1.9			95	
2814.20	1200x450 RCBC PRECAST (6/2.44)	0.4				4.2	23.2	116.0		0.4			2.1			103	
	TOTAL QUANTITIES	0.8				8.0	44.5	223		0.8			4.0			198	MESH QUANTITIES ARE NET ONLY NO ALLOWANCES MADE FOR LAPS ETC.
	TOTAL MESH	50.2/RL1218 TOTAL NUMBER OF ANCHOR BARS IN PRECAST ENDS 108															



CH952.5 CULVERT LAYOUT PLAN
NOT TO SCALE

The works shown on this drawing are a factual representation of the works c[illegible]

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

1 0 1 2 3 4 5m
SCALE 1:50 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		3	05.05.23	AS BUILT	JAG	PN	PML	SW
		2	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-REP-00004	PAVEMENT DESIGN REPORT	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION
Signature "OMITTED FROM AS BUILT"
NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

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STATUS ASB

CONTRACTOR DWG No. 201237 C121

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

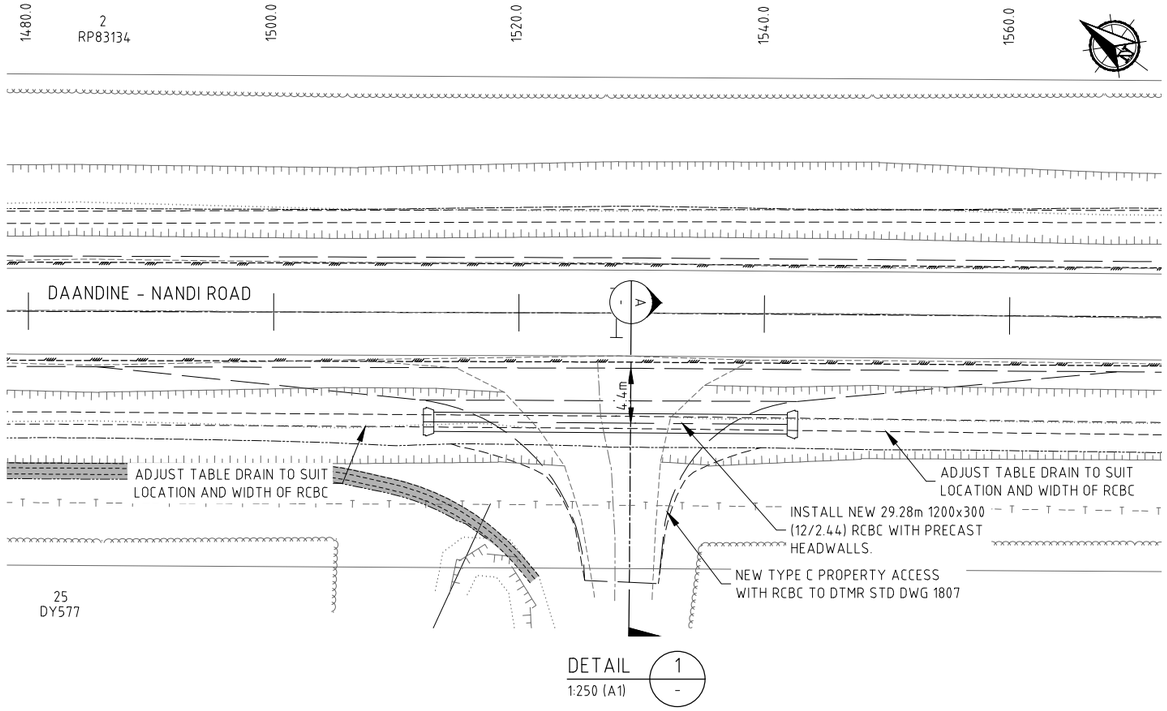
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1 DRAINAGE DETAILS

DRAWING No. S00B01-ARW-CIV-DET-00058

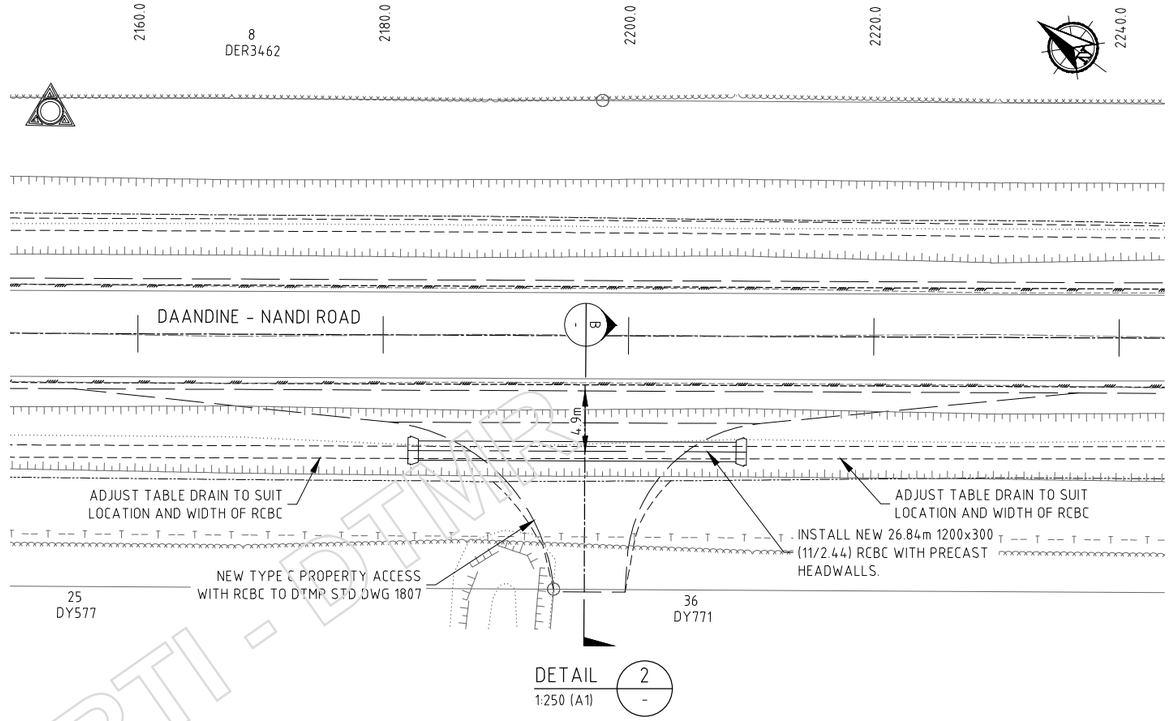
SCALE 1:50m

REV 3

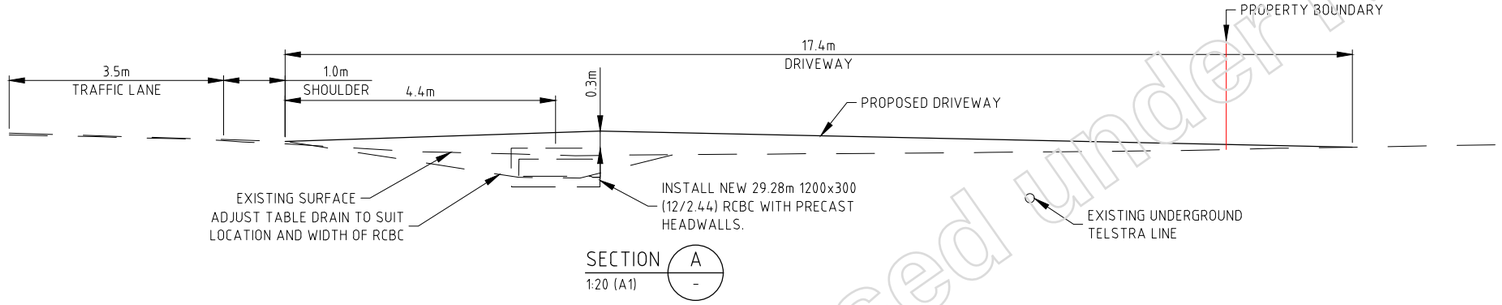
A1



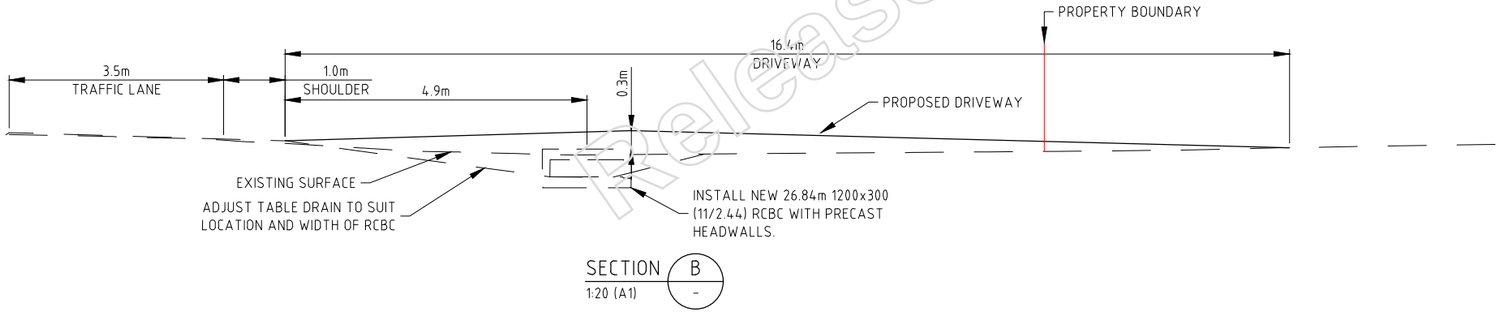
DETAIL 1 / - (1:250 (A1))



DETAIL 2 / - (1:250 (A1))



SECTION A / - (1:20 (A1))



SECTION B / - (1:20 (A1))

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The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REFERENCE DRAWING NUMBER	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK	QA	APP
S00B01-ARW-CIV-LAY-00052	DAANDINE-NANDI ROAD SECTION 1 LAYOUT SHEET 4 OF 6							
S00B01-ARW-CIV-LAY-00051	DAANDINE-NANDI ROAD SECTION 1 LAYOUT SHEET 3 OF 6							
S00B01-ARW-CIV-SUR-00017	DAANDINE-NANDI ROAD SECTION 1 SURVEY SHEET 4 OF 6	1	05.05.23	AS BUILT	JAG	PM	PML	SW
S00B01-ARW-CIV-SUR-00016	DAANDINE-NANDI ROAD SECTION 1 SURVEY SHEET 3 OF 6	0	05.10.22	ISSUE FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-DET-00056	DAANDINE-NANDI ROAD SECTION 1 LOCALITY PLAN LAYOUT	A	26.08.22	ISSUE FOR REVIEW	JAG	PRH	PML	PML

RPEQ CERTIFICATION "OMITTED FROM Signature "AS BUILT" NR

brandon & associates — engineers & project managers — personal professional practical

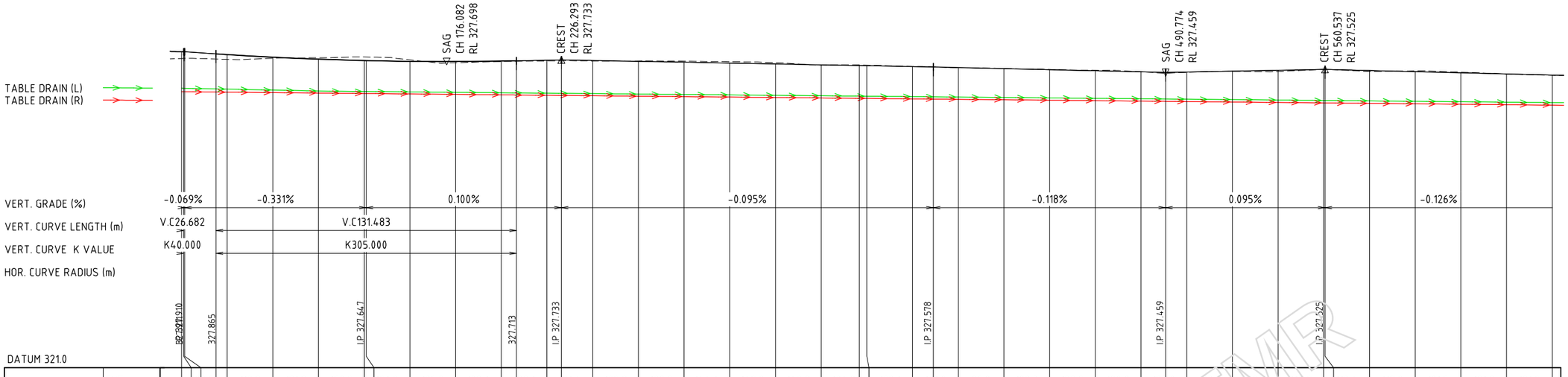
arrow energy — go further

SITE	PLANT	PROJECT CODE
S00	B01	A196

SECURITY CLASSIFICATION: RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1 DRIVEWAY
GENERAL ARRANGEMENT

STATUS	CONTRACTOR DRAWING NUMBER	ARROW ENERGY DRAWING NUMBER	SCALE	REV	SIZE
ASB	201237 C122	S00B01-ARW-CIV-GAT-00154	AS SHOWN	1	A1



DATUM 321.0

EARTHWORKS	CUT		97.5	113.7	131.7	150.7	156.3	135.8	132.6	132.1	131.4	135.7	139.0	144.4	147.9	143.8	134.2	133.1	101.0	95.2	128.0	133.5	129.9	123.9	123.6	118.7	114.7	113.4	117.8	121.5	121.8	121.5
	FILL		11.7	6.0	5.7	3.1	1.0	1.4	2.0	2.4	2.5	1.9	1.7	1.2	1.3	1.0	1.3	2.0	5.3	5.0	1.1	1.1	1.3	0.6	1.1	1.6	2.9	3.9	3.2	3.7	2.5	1.7
GUIDE POSTS (L)		□								□								□						□								□
GUIDE POSTS (R)		■								■								■						■								■
DRAIN (R)		327.037	327.037	327.037	327.030	327.027	327.018	327.008	326.998	326.997	326.988	326.978	326.968	326.965	326.959	326.956	326.949	326.939	326.929	326.919	326.910	326.900	326.892	326.890	326.880	326.876	326.870	326.860	326.851	326.841	326.831	326.826	326.821	326.811	326.802	326.792	326.791	326.782	326.772	326.762	326.752	326.743
DRAIN (L)		327.114	327.113	327.113	327.099	327.094	327.073	327.053	327.042	327.042	327.033	327.023	327.014	327.011	327.005	327.002	326.995	326.986	326.977	326.967	326.958	326.949	326.941	326.939	326.930	326.926	326.921	326.911	326.902	326.893	326.883	326.878	326.874	326.865	326.855	326.846	326.846	326.836	326.827	326.818	326.808	326.799
SHOULDER (L)		327.776	327.776	327.775	327.730	327.714	327.658	327.614	327.584	327.583	327.567	327.563	327.572	327.578	327.591	327.598	327.585	327.566	327.547	327.528	327.509	327.490	327.474	327.471	327.452	327.443	327.431	327.407	327.384	327.360	327.336	327.324	327.333	327.352	327.371	327.390	327.390	327.366	327.340	327.315	327.290	327.265
SHOULDER (R)		327.776	327.776	327.775	327.730	327.714	327.658	327.614	327.584	327.583	327.567	327.563	327.572	327.578	327.591	327.598	327.585	327.566	327.547	327.528	327.509	327.490	327.474	327.471	327.452	327.443	327.431	327.407	327.384	327.360	327.336	327.324	327.333	327.352	327.371	327.390	327.390	327.366	327.340	327.315	327.290	327.265
EXISTING SURFACE LEVEL		327.763	327.762	327.765	327.752	327.745	327.768	327.779	327.796	327.795	327.735	327.669	327.697	327.702	327.711	327.718	327.709	327.710	327.705	327.692	327.671	327.625	327.622	327.618	327.592	327.578	327.561	327.543	327.524	327.508	327.474	327.440	327.461	327.482	327.479	327.524	327.525	327.479	327.492	327.463	327.425	327.398
DESIGN CL LEVEL		327.911	327.911	327.910	327.865	327.849	327.793	327.749	327.719	327.718	327.702	327.698	327.707	327.713	327.726	327.733	327.720	327.701	327.682	327.663	327.644	327.625	327.609	327.606	327.587	327.578	327.566	327.542	327.519	327.495	327.471	327.459	327.468	327.487	327.506	327.525	327.525	327.501	327.475	327.450	327.425	327.400
CHAINAGE		60.000	60.936	61.412	75.125	80.000	100.000	120.000	140.000	140.867	160.000	180.000	200.000	206.606	220.000	226.293	240.000	260.000	280.000	300.000	320.000	340.000	356.677	360.000	380.000	389.076	400.000	420.000	440.000	460.000	480.000	490.774	500.000	520.000	540.000	560.000	560.537	580.000	600.000	620.000	640.000	660.000
SUPERELEVATION		LHS and RHS -3%																																								

REFER TO DOC. No.
S00B01-ARW-CIV-MTO-00010
FOR EARTHWORKS TOTALS

LONGITUDINAL SECTION SECTION 1
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:50

SCALE 1:1000m HORIZONTAL (A1)

SCALE 1:100m VERTICAL (A1)

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	05.05.23	AS BUILT	JAG	PN	PLM	SW
S00B01-ARW-CIV-LSN-00030	LONGITUDINAL SECTIONS SHEET 2 OF 7	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

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STATUS ASB

CONTRACTOR DWG No. 201237 C130

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

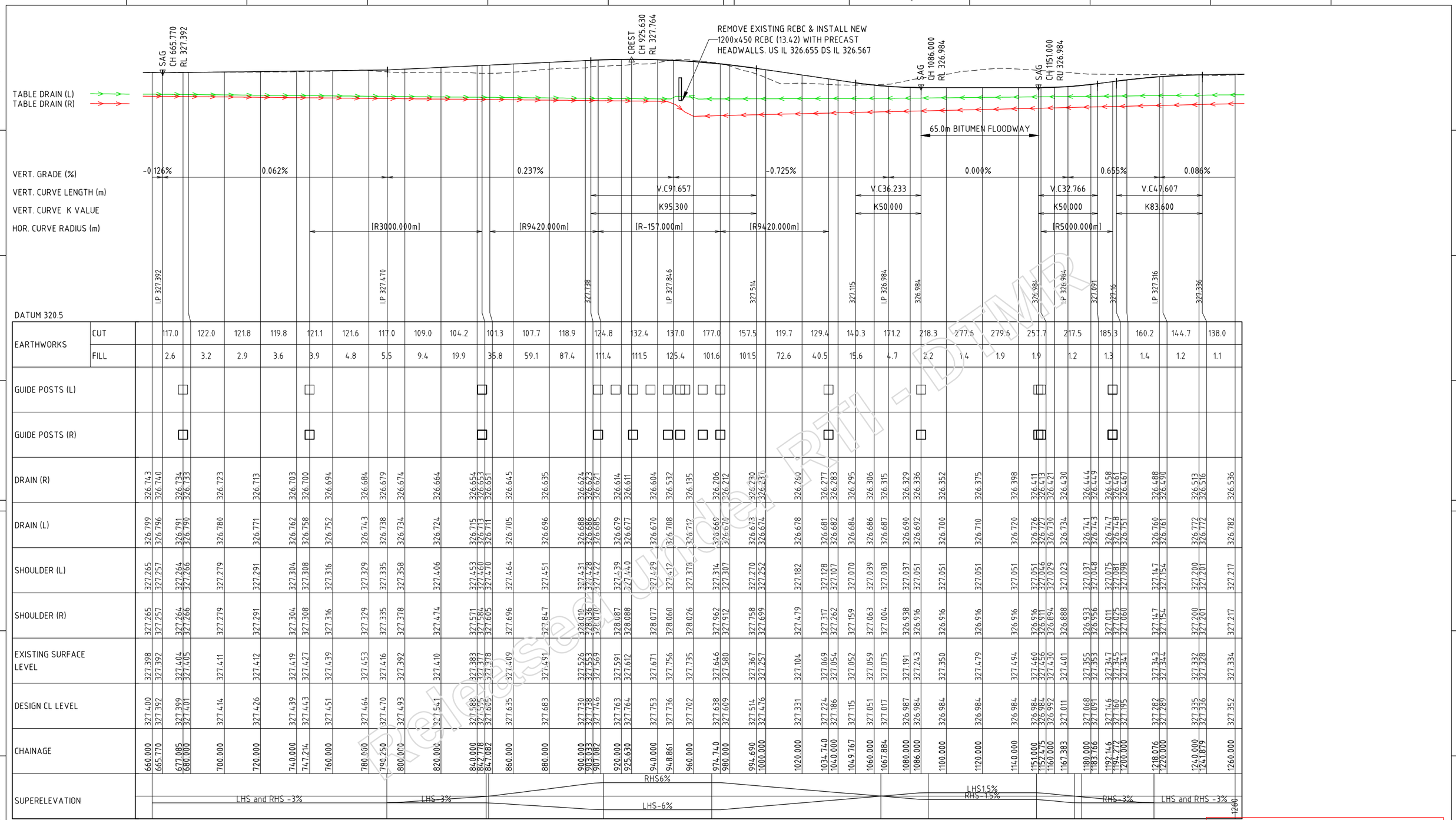
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 1 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00029

SCALE AS SHOWN

REV 2

A1



EARTHWORKS	CUT		117.0	122.0	121.8	119.8	121.1	121.6	117.0	109.0	104.2	101.3	107.7	118.9	124.8	132.4	137.0	177.0	157.5	119.7	129.4	140.3	171.2	218.3	277.6	279.6	257.7	217.5	185.3	160.2	144.7	138.0
	FILL		2.6	3.2	2.9	3.6	3.9	4.8	5.5	9.4	19.9	35.8	59.1	87.4	111.4	111.5	125.4	101.6	101.5	72.6	40.5	15.6	4.7	2.2	1.4	1.9	1.9	1.2	1.3	1.4	1.2	1.1
GUIDE POSTS (L)			□				□				□				□	□	□	□	□			□		□			□		□			
GUIDE POSTS (R)			□				□				□				□	□	□	□	□			□		□			□		□			
DRAIN (R)		326.743	326.740	326.734	326.733	326.723	326.713	326.703	326.700	326.694	326.684	326.679	326.674	326.664	326.654	326.653	326.651	326.645	326.635	326.624	326.623	326.621	326.614	326.611	326.604	326.532	326.135	326.206	326.212	326.230	326.231	326.260	326.277	326.283	326.295	326.306	326.315	326.329	326.336	326.352	326.375	326.398	326.411	326.413	326.421	326.430	326.444	326.449	326.458	326.461	326.467	326.488	326.490	326.513	326.516	326.536
DRAIN (L)		326.799	326.796	326.791	326.790	326.780	326.771	326.762	326.758	326.752	326.743	326.738	326.734	326.724	326.715	326.713	326.711	326.705	326.696	326.688	326.686	326.685	326.679	326.677	326.670	326.708	326.712	326.669	326.670	326.673	326.674	326.678	326.681	326.682	326.684	326.686	326.687	326.690	326.692	326.700	326.710	326.720	326.726	326.727	326.730	326.734	326.741	326.743	326.747	326.748	326.751	326.760	326.761	326.772	326.772	326.782
SHOULDER (L)		327.265	327.257	327.264	327.266	327.279	327.291	327.304	327.308	327.316	327.329	327.335	327.358	327.406	327.453	327.450	327.470	327.464	327.451	327.431	327.428	327.422	327.439	327.440	327.429	327.412	327.378	327.314	327.307	327.270	327.252	327.182	327.128	327.107	327.070	327.039	327.030	327.037	327.051	327.051	327.051	327.051	327.051	327.046	327.029	327.023	327.037	327.048	327.075	327.081	327.098	327.147	327.154	327.200	327.201	327.217
SHOULDER (R)		327.265	327.257	327.264	327.266	327.279	327.291	327.304	327.308	327.316	327.329	327.335	327.378	327.474	327.571	327.581	327.605	327.696	327.847	328.010	328.036	328.070	328.087	328.088	328.077	328.060	328.026	327.962	327.912	327.758	327.699	327.479	327.317	327.262	327.159	327.063	327.004	326.938	326.916	326.916	326.916	326.916	326.916	326.911	326.894	326.888	326.933	326.956	327.011	327.025	327.060	327.147	327.154	327.200	327.201	327.217
EXISTING SURFACE LEVEL		327.398	327.392	327.404	327.405	327.411	327.412	327.419	327.427	327.439	327.453	327.416	327.392	327.410	327.383	327.377	327.378	327.409	327.491	327.526	327.533	327.569	327.591	327.612	327.671	327.756	327.735	327.646	327.580	327.367	327.257	327.104	327.069	327.054	327.052	327.059	327.075	327.191	326.243	326.350	326.479	326.494	327.460	326.984	327.456	327.430	327.401	327.355	327.353	327.347	327.345	327.341	327.343	327.344	327.332	327.328	327.334
DESIGN CL LEVEL		327.400	327.392	327.399	327.401	327.414	327.426	327.439	327.443	327.451	327.464	327.470	327.493	327.541	327.588	327.595	327.605	327.635	327.683	327.730	327.738	327.746	327.763	327.764	327.753	327.736	327.702	327.638	327.609	327.514	327.476	327.331	327.224	327.186	327.115	327.051	327.017	326.987	326.984	326.984	326.984	326.984	326.984	326.984	326.992	327.011	327.068	327.091	327.146	327.160	327.195	327.282	327.289	327.335	327.336	327.352
CHAINAGE		660.000	665.770	677.085	680.000	700.000	720.000	740.000	747.214	760.000	780.000	790.250	800.000	820.000	840.000	847.778	847.982	860.000	880.000	900.000	903.033	907.082	920.000	925.630	940.000	948.861	960.000	974.740	980.000	994.690	1000.000	1020.000	1034.740	1040.000	1049.767	1060.000	1067.884	1080.000	1086.000	1100.000	1120.000	1140.000	1151.000	1152.475	1160.000	1167.383	1180.000	1183.766	1192.146	1194.272	1200.000	1218.076	1220.000	1240.000	1241.879	1260.000
SUPERELEVATION		LHS and RHS -3%		LHS -3%											RHS6%			LHS-6%													LHS1.5% RHS-1.5%												RHS-3%				LHS and RHS -3%								

660 790 848 910 970 1064 1090 1150 1171 1175 1215 1260

LONGITUDINAL SECTION SECTION 1
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:50

Released under RTI - DTMR

20 10 0 20 40 60 80 100m
SCALE 1:1000m HORIZONTAL (A1)
2 1 0 2 4 6 8 10m
SCALE 1:100m VERTICAL (A1)

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		3	05.05.23	AS BUILT	JAG	PN	PML	SW
		2	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LSN-00031	LONGITUDINAL SECTIONS SHEET 3 OF 7	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LSN-00029	LONGITUDINAL SECTIONS SHEET 1 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION
NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

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STATUS ASB

CONTRACTOR DWG No. 201237 C131

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

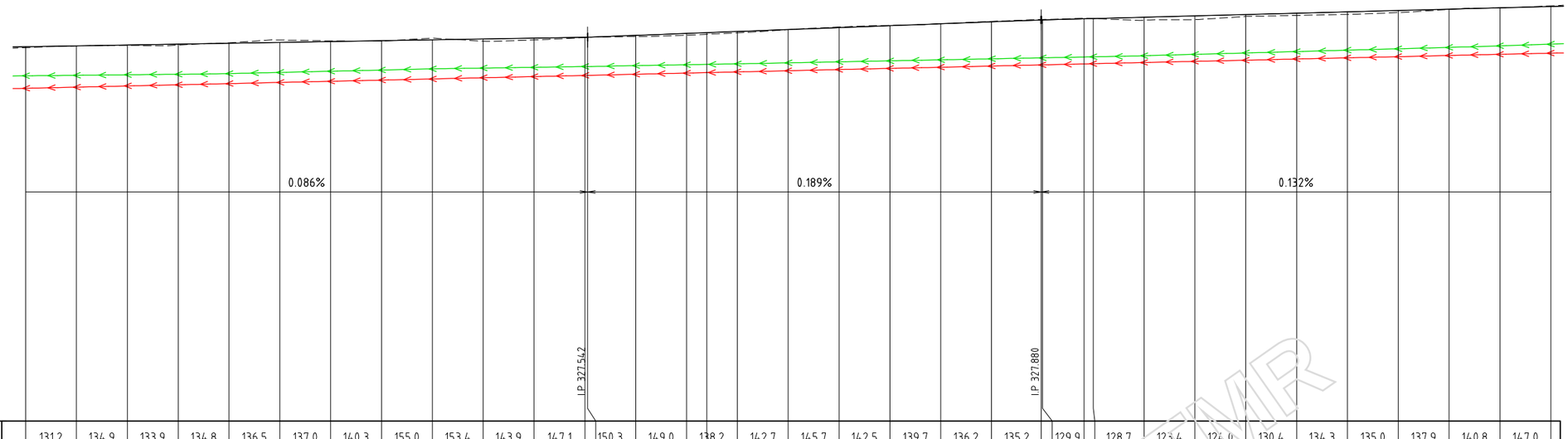
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 2 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00030

SCALE AS SHOWN

REV 3

A1



DATUM 320.0

EARTHWORKS	CUT		131.2	134.9	133.9	134.8	136.5	137.0	140.3	155.0	153.4	143.9	147.1	150.3	149.0	138.2	142.7	145.7	142.5	139.7	136.2	135.2	129.9	128.7	123.4	124.0	130.4	134.3	135.0	137.9	140.8	147.0
	FILL		1.6	3.0	2.8	1.8	1.8	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.4	2.3	3.2	3.6	3.3	3.0	4.6	5.5	6.1	7.0	6.3	4.7	3.3	2.6	3.5	5.8	3.9
GUIDE POSTS (L)							□							□		□							□								□	
GUIDE POSTS (R)							□							□		□							□								□	
DRAIN (R)		326.536	326.559	326.583	326.606	326.629	326.652	326.675	326.698	326.721	326.744	326.767	326.790	326.791	326.813	326.836	326.845	326.859	326.882	326.905	326.928	326.951	326.974	326.996	326.997	327.016	327.020	327.043	327.066	327.089	327.112	327.135	327.158	327.181	327.204	327.227
DRAIN (L)		326.782	326.792	326.802	326.813	326.826	326.849	326.872	326.896	326.919	326.934	326.949	326.964	326.965	326.982	327.000	327.007	327.018	327.037	327.057	327.076	327.096	327.116	327.135	327.136	327.152	327.156	327.176	327.204	327.231	327.258	327.286	327.313	327.340	327.371	327.403
SHOULDER (L)		327.217	327.234	327.251	327.268	327.286	327.303	327.320	327.337	327.354	327.371	327.389	327.406	327.407	327.443	327.480	327.496	327.518	327.556	327.594	327.632	327.670	327.708	327.745	327.745	327.767	327.772	327.798	327.825	327.851	327.878	327.904	327.930	327.957	327.983	328.010
SHOULDER (R)		327.217	327.234	327.251	327.268	327.286	327.303	327.320	327.337	327.354	327.371	327.389	327.406	327.407	327.443	327.480	327.496	327.518	327.556	327.594	327.632	327.670	327.708	327.745	327.745	327.767	327.772	327.798	327.825	327.851	327.878	327.904	327.930	327.957	327.983	328.010
EXISTING SURFACE LEVEL		327.334	327.368	327.379	327.385	327.431	327.485	327.468	327.464	327.522	327.462	327.482	327.533	327.536	327.553	327.582	327.596	327.626	327.689	327.740	327.773	327.804	327.851	327.888	327.888	327.912	327.907	327.874	327.885	327.948	327.967	327.989	328.026	328.087	328.118	328.157
DESIGN CL LEVEL		327.352	327.369	327.386	327.403	327.421	327.438	327.455	327.472	327.489	327.506	327.524	327.541	327.542	327.578	327.615	327.631	327.653	327.691	327.729	327.767	327.805	327.843	327.880	327.880	327.902	327.907	327.933	327.960	327.986	328.013	328.039	328.065	328.092	328.118	328.145
CHAINAGE		1260.000	1280.000	1300.000	1320.000	1340.000	1360.000	1380.000	1400.000	1420.000	1440.000	1460.000	1480.000	1481.082	1500.000	1520.000	1527.950	1540.000	1560.000	1580.000	1600.000	1620.000	1640.000	1659.555	1660.000	1676.366	1680.000	1700.000	1720.000	1740.000	1760.000	1780.000	1800.000	1820.000	1840.000	1860.000
SUPERELEVATION																																				

LHS and RHS -3%

1260 — 1860

LONGITUDINAL SECTION SECTION 1
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:50

Released under NER RTI - DTMR

SCALE 1:1000m HORIZONTAL (A1)

SCALE 1:100m VERTICAL (A1)

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-LSN-00032	LONGITUDINAL SECTIONS SHEET 4 OF 7	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LSN-00030	LONGITUDINAL SECTIONS SHEET 2 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C132

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 3 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00031

SCALE AS SHOWN

REV 2

A1

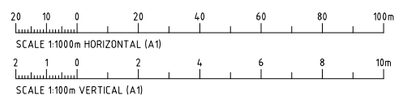


VERT. GRADE (%)			0.132%									0.099%									0.048%							0.163%		
VERT. CURVE LENGTH (m)						I.P 328.268											I.P 328.500									I.P 328.593				
VERT. CURVE K VALUE																														
HOR. CURVE RADIUS (m)																														
DATUM 315.0																														
EARTHWORKS	CUT		148.6	144.8	150.8	151.6	147.2	142.6	140.6	141.0	138.0	143.4	138.6	136.7	140.5	141.5	143.5	148.6	150.3	142.6	139.9	136.4	130.9	124.9	124.7	126.6	131.3	141.5	143.3	140.4	140.2	138.7
	FILL		2.3	3.6	2.3	1.8	2.7	3.6	3.2	3.5	2.9	2.3	1.9	1.9	1.7	1.9	2.3	2.8	3.5	4.2	3.1	3.3	3.9	3.8	2.6	2.2	1.7	1.4	1.2	1.5	1.3	1.2
GUIDE POSTS (L)								□			□								□							□						
GUIDE POSTS (R)								■			■								■							■						
DRAIN (R)		327.227	327.250	327.273	327.296	327.319	327.334	327.342	327.365	327.388	327.411	327.424	327.434	327.457	327.480	327.503	327.526	327.549	327.572	327.595	327.604	327.618	327.641	327.664	327.687	327.710	327.733	327.756	327.780	327.803	327.826	327.830	327.849	327.872	327.895	327.918
DRAIN (L)		327.403	327.435	327.460	327.477	327.495	327.506	327.512	327.530	327.548	327.565	327.575	327.583	327.600	327.618	327.635	327.653	327.670	327.688	327.705	327.712	327.723	327.741	327.778	327.808	327.838	327.869	327.899	327.929	327.957	327.980	327.984	328.002	328.025	328.047	328.070
SHOULDER (L)		328.010	328.036	328.063	328.089	328.115	328.133	328.139	328.159	328.179	328.199	328.210	328.219	328.239	328.258	328.278	328.298	328.318	328.338	328.357	328.365	328.371	328.380	328.390	328.399	328.409	328.418	328.428	328.437	328.447	328.456	328.458	328.484	328.517	328.549	328.582
SHOULDER (R)		328.010	328.036	328.063	328.089	328.115	328.133	328.139	328.159	328.179	328.199	328.210	328.219	328.239	328.258	328.278	328.298	328.318	328.338	328.357	328.365	328.371	328.380	328.390	328.399	328.409	328.418	328.428	328.437	328.447	328.456	328.458	328.484	328.517	328.549	328.582
EXISTING SURFACE LEVEL		328.157	328.182	328.212	328.246	328.262	328.279	328.275	328.264	328.290	328.292	328.316	328.326	328.337	328.341	328.406	328.411	328.425	328.453	328.491	328.504	328.505	328.507	328.504	328.485	328.467	328.481	328.509	328.519	328.532	328.593	328.591	328.583	328.644	328.664	328.689
DESIGN CL LEVEL		328.145	328.171	328.198	328.224	328.250	328.268	328.274	328.294	328.314	328.334	328.345	328.354	328.374	328.393	328.413	328.433	328.453	328.473	328.492	328.500	328.506	328.515	328.525	328.534	328.544	328.553	328.563	328.572	328.582	328.591	328.593	328.619	328.652	328.684	328.717
CHAINAGE		1860.0	1880.0	1900.0	1920.0	1940.0	1953.145	1960.0	1980.0	2000.0	2020.0	2031.145	2040.0	2060.0	2080.0	2100.0	2120.0	2140.0	2160.0	2180.0	2187.469	2200.0	2220.0	2240.0	2260.0	2280.0	2300.0	2320.0	2340.0	2360.0	2380.0	2384.080	2400.0	2420.0	2440.0	2460.0
SUPERELEVATION		LHS and RHS -3%																																		

1860 2460

LONGITUDINAL SECTION - DAANDINE-NANDI ROAD SECTION 1 (4)
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

Released under RTI - DTMR



The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LSN-00033	LONGITUDINAL SECTIONS SHEET 5 OF 7	1	05.05.23	AS BUILT	JAG	PN	PLM	SW
S00B01-ARW-CIV-LSN-00031	LONGITUDINAL SECTIONS SHEET 3 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

STATUS

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

ASB

arrow energy go further

CONTRACTOR DWG No. 201237 C133

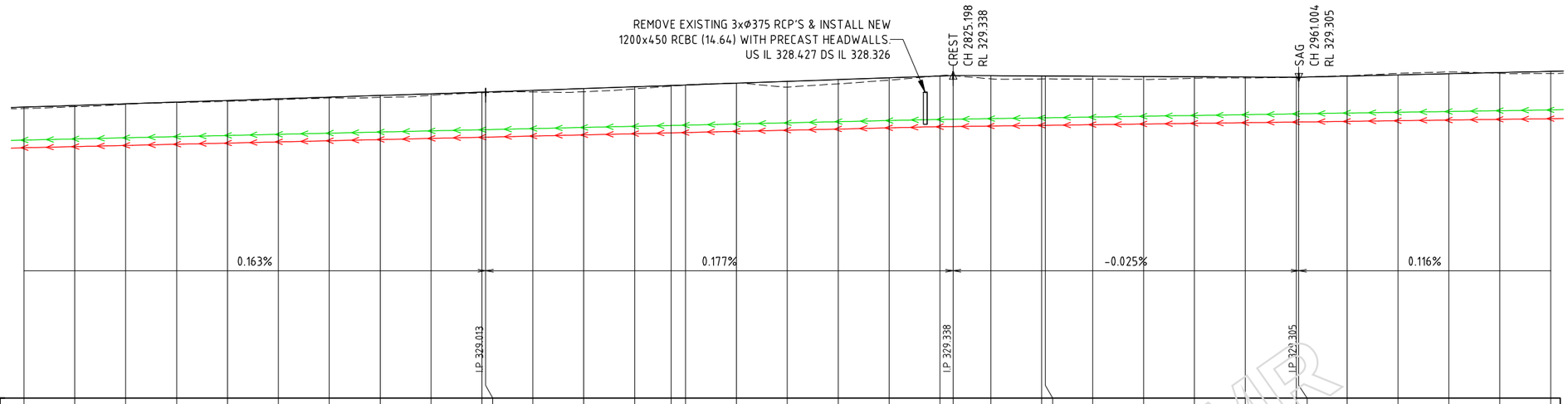
SITE S00
PLANT B01

SECURITY CLASSIFICATION RESTRICTED

DRAWING No. S00B01-ARW-CIV-LSN-00032

SCALE AS SHOWN | REV 1 | A1

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 4 OF 7



DATUM 323.0

EARTHWORKS	CUT		136.3	135.3	135.1	135.2	134.2	141.0	140.6	135.4	138.2	140.3	137.7	139.9	147.3	163.5	135.2	135.6	138.9	140.2	183.2	124.1	123.0	126.7	130.4	137.0	138.8	143.6	148.3	148.0	140.6	136.4
	FILL		1.3	1.2	1.4	1.6	1.8	1.7	1.1	1.3	1.6	1.6	1.6	1.4	1.8	1.2	3.6	5.6	5.6	9.7	6.7	11.6	10.7	10.9	9.3	8.2	6.8	5.6	4.9	6.1	6.4	5.8
GUIDE POSTS (L)			□				□				□				□					□			□							□		
GUIDE POSTS (R)			■				■				■				■					■			■							■		
DRAIN (R)		327.918	327.941	327.964	327.987	328.010	328.033	328.056	328.079	328.102	328.125	328.148	328.171	328.194	328.210	328.240	328.263	328.286	328.309	326.332	323.355	328.345	328.358	328.371	328.384	328.397	328.410	328.424	328.437	328.450	328.463	328.476	328.489
DRAIN (L)		328.070	328.092	328.115	328.137	328.160	328.182	328.205	328.227	328.250	328.273	328.295	328.318	328.340	328.356	328.385	328.408	328.430	328.453	328.475	328.479	328.491	328.506	328.522	328.537	328.553	328.569	328.584	328.600	328.615	328.631	328.647	328.662
SHOULDER (L)		328.582	328.615	328.647	328.680	328.712	328.745	328.778	328.810	328.843	328.875	328.911	328.946	328.981	329.007	329.052	329.088	329.123	329.159	329.194	329.203	329.200	329.195	329.190	329.185	329.180	329.175	329.170	329.192	329.215	329.238	329.262	329.285
SHOULDER (R)		328.582	328.615	328.647	328.680	328.712	328.745	328.778	328.810	328.843	328.875	328.911	328.946	328.981	329.007	329.052	329.088	329.123	329.159	329.194	329.203	329.200	329.195	329.190	329.185	329.180	329.175	329.170	329.192	329.215	329.238	329.262	329.285
EXISTING SURFACE LEVEL		328.689	328.725	328.772	328.806	328.832	328.865	328.893	328.909	328.948	328.998	329.015	329.019	329.077	329.132	329.188	329.110	329.174	329.247	329.335	329.333	329.274	329.271	329.267	329.262	329.285	329.290	329.304	329.334	329.379	329.409	329.381	329.379
DESIGN CL LEVEL		328.717	328.750	328.782	328.815	328.847	328.880	328.913	328.945	328.978	329.010	329.046	329.081	329.116	329.142	329.187	329.223	329.258	329.294	329.329	329.338	329.335	329.330	329.325	329.320	329.315	329.310	329.305	329.327	329.350	329.373	329.397	329.420
CHAINAGE		2460.000	2480.000	2500.000	2520.000	2540.000	2560.000	2580.000	2600.000	2620.000	2640.070	2641.464	2660.000	2680.000	2700.000	2714.300	2720.000	2740.000	2760.000	2780.000	2800.000	2820.000	2825.198	2840.000	2860.000	2861.373	2880.000	2900.000	2920.000	2940.000	2960.000	2961.004	2980.000	3000.000	3020.000	3040.000	3060.000
SUPERELEVATION		LHS and RHS -3%																																			

2460 3060

LONGITUDINAL SECTION SECTION 1
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:50

Released under the Queensland Government Open Data Licence - DTMR

SCALE 1:1000m HORIZONTAL (A1)

SCALE 1:100m VERTICAL (A1)

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	05.05.23	AS BUILT	JAG	PN	PLM	SW
S00B01-ARW-CIV-LSN-00034	LONGITUDINAL SECTIONS SHEET 6 OF 7	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LSN-00032	LONGITUDINAL SECTIONS SHEET 4 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"
NR

brandon & associates ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C134

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

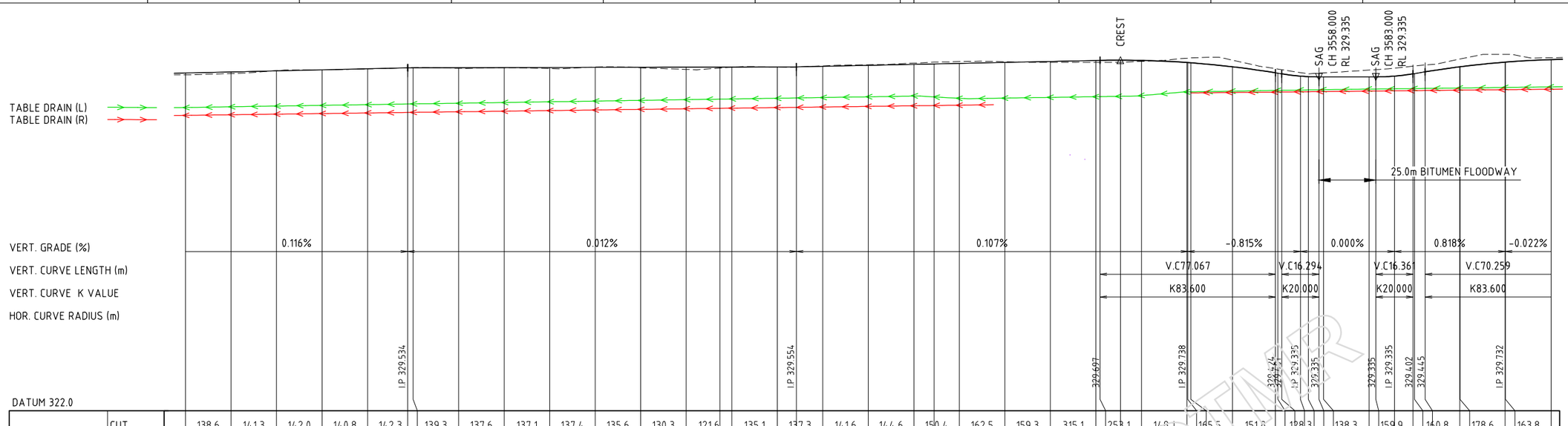
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 5 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00033

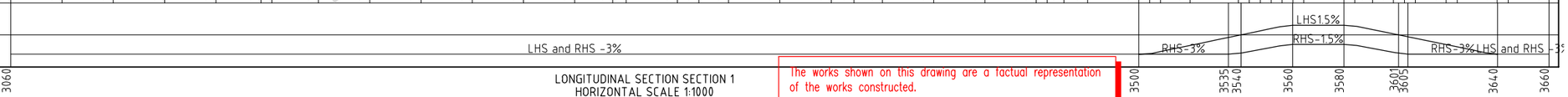
SCALE AS SHOWN

REV 2

A1



EARTHWORKS	CUT		138.6	141.3	142.0	140.8	142.3	139.3	137.6	137.1	137.4	135.6	130.3	121.6	135.1	137.3	141.6	144.6	150.4	162.5	159.3	315.1	253.1	140.1	165.5	151.0	128.3	138.3	159.9	160.8	178.6	163.8
	FILL		5.7	5.4	6.5	7.5	8.8	9.5	8.8	8.4	6.6	5.8	6.1	7.1	4.6	4.7	4.1	4.0	3.8	4.2	3.2	9.2	6.6	3.5	3.0	2.1	4.1	5.3	1.4	0.6	0.6	0.6
GUIDE POSTS (L)			□					□						□					□						□		□	□			□		
GUIDE POSTS (R)			□					□						□					□						□		□	□			□		
DRAIN (R)		328.489	328.502	328.516	328.529	328.542	328.553	328.555	328.568	328.581	328.594	328.607	328.621	328.634	328.643	328.647	328.660	328.666	328.673	328.686	328.699	328.705	328.713				328.991		329.001	329.002	329.007	329.008	329.011	329.012	329.022	329.024	329.028	329.032	329.032	329.035	329.043	329.043	329.053	329.053	329.063
DRAIN (L)		328.662	328.678	328.694	328.709	328.725	328.739	328.740	328.756	328.772	328.787	328.803	328.818	328.834	328.846	328.850	328.865	328.872	328.881	328.897	328.913	328.893	328.864	328.868	328.884	328.900	329.004		329.036	329.037	329.038	329.045	329.047	329.051	329.053	329.066	329.068	329.073	329.078	329.078	329.081	329.090	329.090	329.103	329.103	329.115
SHOULDER (L)		329.285	329.308	329.331	329.355	329.378	329.398	329.399	329.401	329.403	329.406	329.408	329.411	329.413	329.415	329.415	329.418	329.419	329.431	329.452	329.475	329.458	329.432	329.442	329.463	329.485	329.513		329.420	329.420	329.408	329.388	329.390	329.402	329.402	329.402	329.402	329.390	329.409	329.412	329.433	329.487	329.488	329.524	329.524	329.580
SHOULDER (R)		329.285	329.308	329.331	329.355	329.378	329.399	329.399	329.401	329.403	329.406	329.408	329.411	329.413	329.415	329.415	329.418	329.419	329.431	329.452	329.474	329.483	329.495						329.282	329.274	329.256	329.257	329.262	329.267	329.261	329.267	329.267	329.257	329.279	329.282	329.310	329.421	329.488	329.524	329.524	329.580
EXISTING SURFACE LEVEL		329.379	329.409	329.470	329.489	329.510	329.534	329.536	329.523	329.536	329.517	329.550	329.533	329.499	329.528	329.546	329.552	329.552	329.576	329.600	329.636	329.658	329.670	329.668	329.655	329.655	329.744		329.514	329.506	329.492	329.402	329.429	329.415	329.421	329.484	329.494	329.526	329.571	329.574	329.596	329.728	329.729	329.827	329.827	329.754
DESIGN CL LEVEL		329.420	329.443	329.466	329.490	329.513	329.534	329.534	329.536	329.538	329.541	329.543	329.546	329.548	329.550	329.550	329.553	329.554	329.566	329.587	329.609	329.618	329.630	329.652	329.673	329.695	329.650		329.424	329.445	329.401	329.351	329.340	329.335	329.335	329.335	329.335	329.351	329.402	329.407	329.445	329.556	329.556	329.659	329.659	329.715
CHAINAGE		3060.000	3080.000	3100.000	3120.000	3140.000	3157.607	3160.000	3180.000	3200.000	3220.000	3240.000	3260.000	3280.000	3294.797	3300.000	3320.000	3328.391	3340.000	3360.000	3380.000	3388.942	3400.000	3420.000	3440.000	3460.000	3500.000		3538.882	3540.000	3541.706	3549.853	3553.325	3558.000	3560.000	3580.000	3583.000	3591.180	3599.361	3600.000	3604.692	3619.939	3620.000	3639.821	3640.000	3660.000
SUPERELEVATION																																													



3060 3500 3535 3540 3560 3580 3601 3605 3640 3660

LONGITUDINAL SECTION SECTION 1
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:50

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

20 10 0 20 40 60 80 100m
SCALE 1:1000m HORIZONTAL (A1)
2 1 0 2 4 6 8 10m
SCALE 1:100m VERTICAL (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-LSN-00035	LONGITUDINAL SECTIONS SHEET 7 OF 7	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LSN-00033	LONGITUDINAL SECTIONS SHEET 5 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

STATUS

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

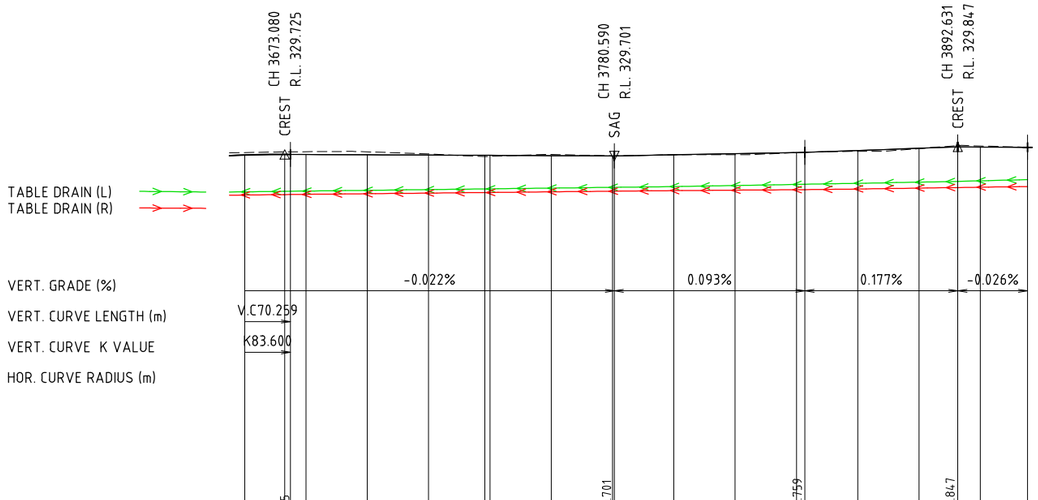
ASB

arrow energy go further

CONTRACTOR DWG No. 201237 C135

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED
DRAWING No. S00B01-ARW-CIV-LSN-00034
SCALE AS SHOWN
REV 2 | A1

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 6 OF 7

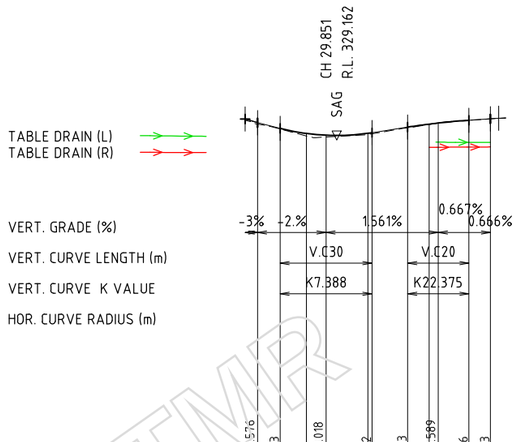


DATUM 323.0

EARTHWORKS	CUT		150.8	154.1	153.9	144.5	148.1	143.2	138.1	136.3	135.2	134.5	132.7	133.7	88.9
	FILL		0.6	0.6	0.6	0.6	0.6	0.8	1.3	1.1	0.8	1.4	1.5	1.4	1.2
GUIDE POSTS (L)						□								□	
GUIDE POSTS (R)						■								■	
DRAIN (R)		329.063	329.070 329.071 329.073	329.084	329.094	329.103 329.104	329.115	329.125 329.125	329.135	329.142	329.149 329.150	329.161	329.176	329.185 329.190	
DRAIN (L)		329.115	329.123 329.124 329.127	329.139	329.151	329.163 329.164	329.176	329.188 329.188	329.200	329.218	329.236 329.238	329.254	329.272	329.285 329.295	
SHOULDER (L)		329.580	329.590 329.590 329.589	329.584	329.580	329.575 329.575	329.571	329.566 329.566	329.584	329.603	329.621 329.624	329.654	329.690	329.712 329.710	
SHOULDER (R)		329.580	329.590 329.590 329.589	329.584	329.580	329.575 329.575	329.571	329.566 329.566	329.584	329.603	329.621 329.624	329.654	329.690	329.712 329.710	
EXISTING SURFACE LEVEL		329.754	329.766 329.767 329.769	329.767	329.732	329.689 329.692	329.723	329.702 329.701	329.718	329.719	329.754 329.759	329.775	329.820	329.868 329.863	329.841
DESIGN CL LEVEL		329.715	329.725 329.725 329.724	329.719	329.715	329.710 329.710	329.706	329.701 329.701	329.719	329.738	329.756 329.759	329.789	329.825	329.847 329.845	329.841
CHAINAGE		3660.000	3673.080 3674.950 3680.000	3700.000	3720.000	3738.337 3740.000	3760.000	3780.000 3780.590	3800.000	3820.000	3840.000 3842.756	3860.000	3880.000	3892.631 3900.000	3915.400
SUPERELEVATION			LHS and RHS -3%												

3660 — 3910

LONGITUDINAL SECTION SECTION 1
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:50



DATUM 317.0

EARTHWORKS	CUT												21.8	98.6	
	FILL													11.6	
GUIDE POSTS (L)		REFER DWG S00B01-ARW-CIV-LAY-0055 FOR GUIDE POST DETAIL & SETOUT TABLE													
GUIDE POSTS (R)															
DRAIN (R)													328.774	328.783	
DRAIN (L)													328.941	328.935	
SHOULDER (L)													329.420 329.464	329.550	
SHOULDER (R)													329.420 329.448	329.512	
EXISTING SURFACE LEVEL		329.655	329.534	329.372	329.146	329.109	329.192	329.216	329.413	329.520 329.567	329.657	329.703			
DESIGN CL LEVEL		329.576	329.393	329.228	329.170	329.232	329.252	329.433	329.532 329.567	329.656	329.703				
CHAINAGE		0.000 4.049	11.381	20.000	26.381	40.000 41.381	53.008	60.000 63.008	73.008	80.000					
SUPERELEVATION															

LONGITUDINAL SECTION THETEN ROAD
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:100

20 10 0 20 40 60 80 100m
SCALE 1:1000m HORIZONTAL (A1)
2 1 0 2 4 6 8 10m
SCALE 1:100m VERTICAL (A1)

Released under RTI - DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
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		1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LSN-00034	LONGITUDINAL SECTIONS SHEET 6 OF 7	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION
Signature "OMITTED FROM AS BUILT"
NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C136

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LONGITUDINAL SECTIONS SHEET 7 OF 7

DRAWING No. S00B01-ARW-CIV-LSN-00035

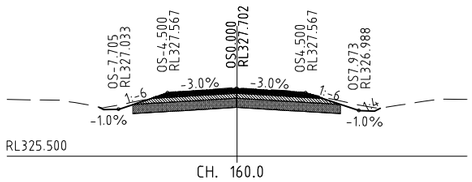
SCALE AS SHOWN

REV 2

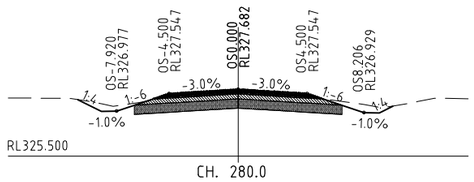
A1

SCALE 1:200m (A1)(HOR)

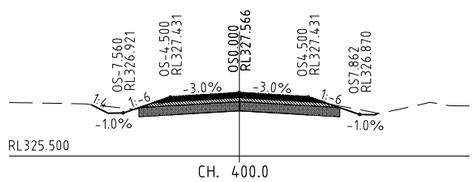
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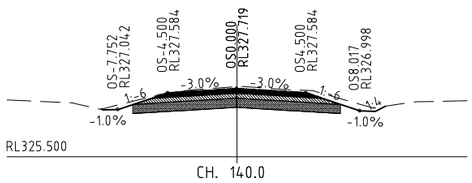
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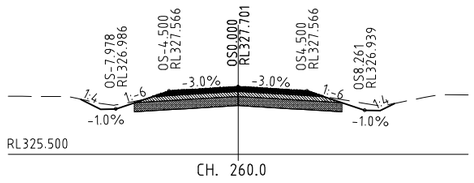
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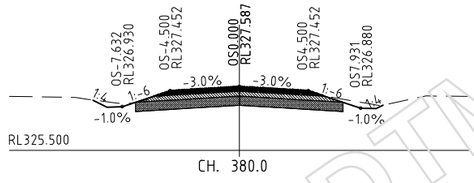
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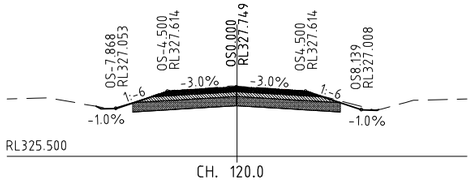
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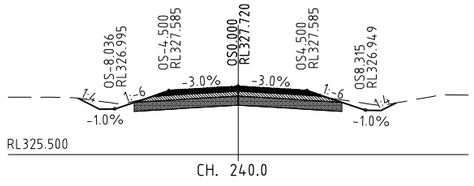
CH. 260.0



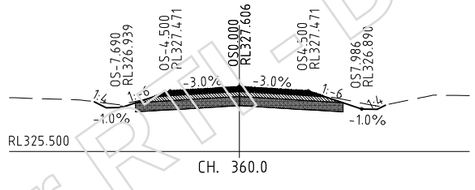
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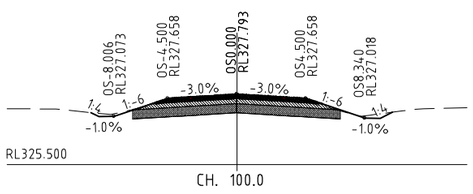
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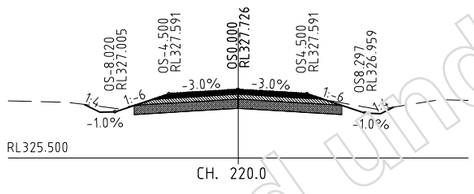
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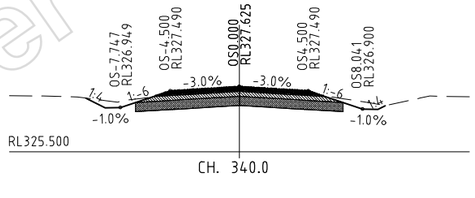
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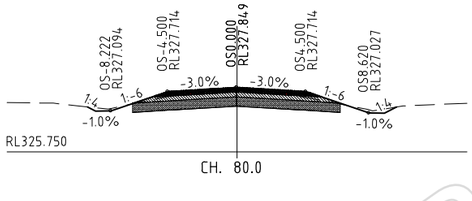
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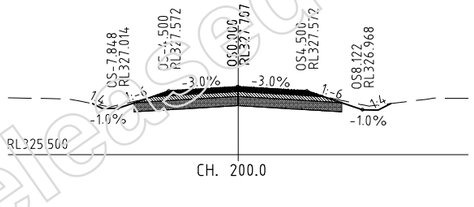
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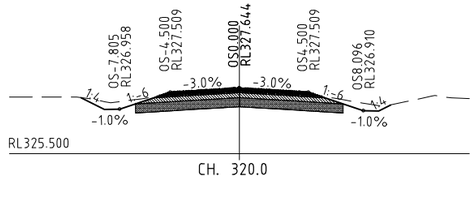
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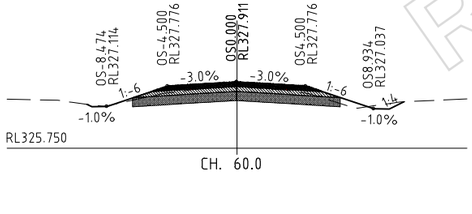
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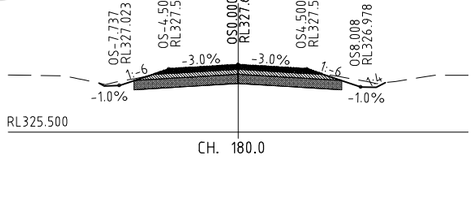
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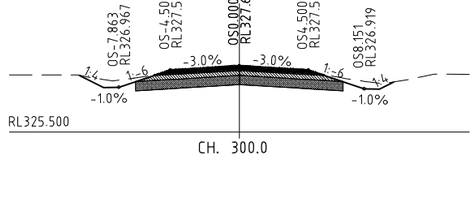
CH. 320.0



CH. 60.0



CH. 180.0



CH. 300.0

Released under RTIO DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
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S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DRY-00050	LONGITUDINAL SECTION 1 OF 6	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

STATUS ASB

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C140

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

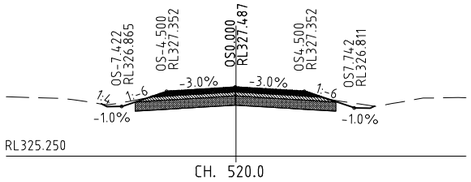
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SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 1 OF 11

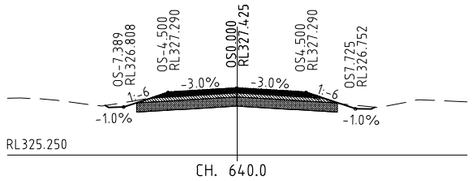
SCALE AS SHOWN | REV 2 | A1

SCALE 1:200m (A1(HOR)

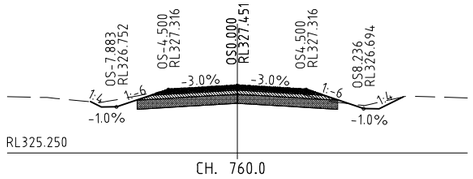
SCALE 1:100m (A1)(VERT)



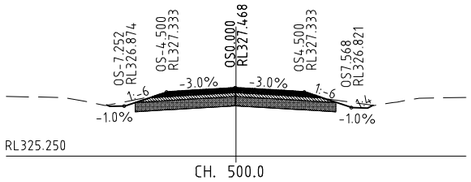
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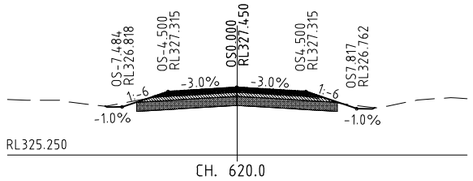
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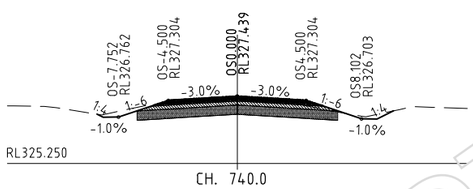
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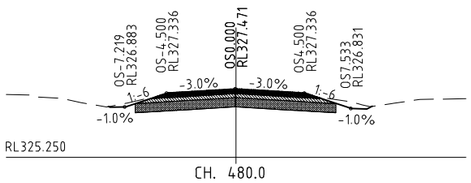
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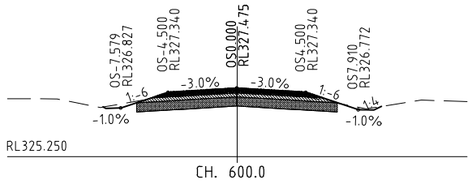
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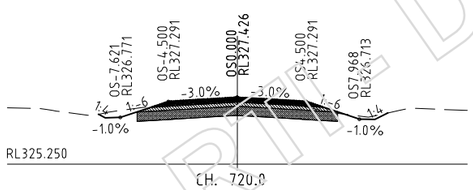
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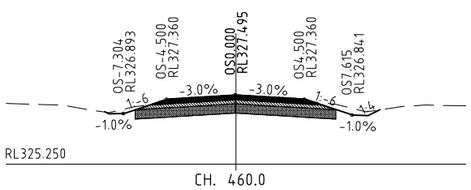
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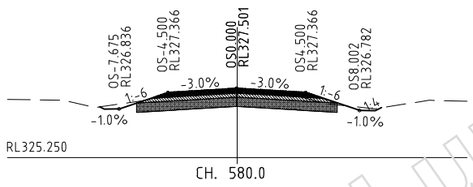
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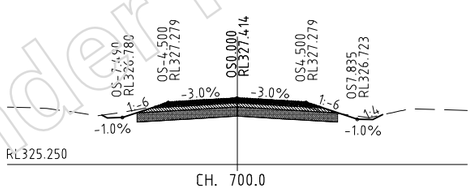
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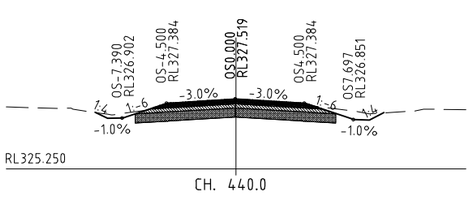
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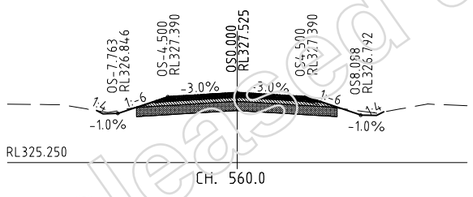
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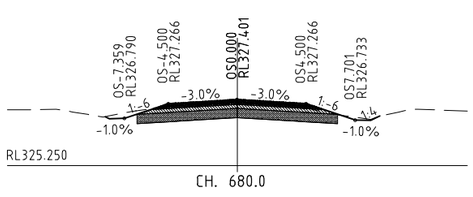
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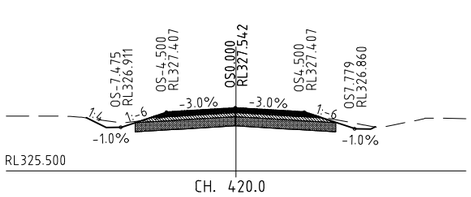
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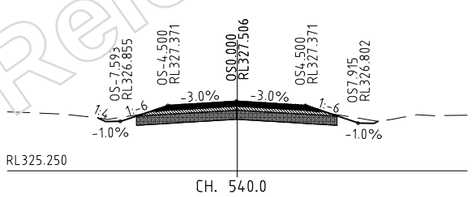
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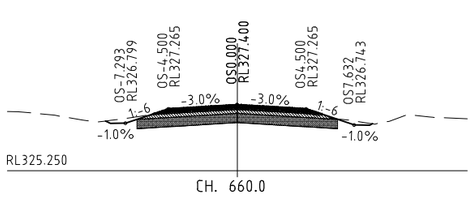
CH. 680.0



CH. 420.0



CH. 540.0



CH. 660.0

Released under PPL DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
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S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00034	CROSS SECTIONS SHEET 1 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

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STATUS ASB

CONTRACTOR DWG No. 201237 C141

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 2 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00035

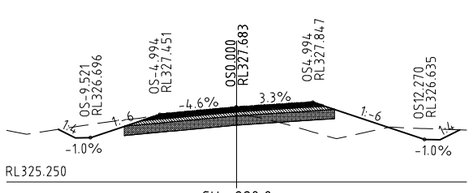
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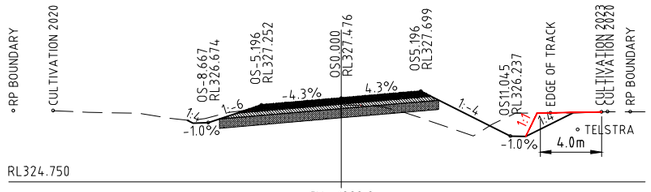
REV 2

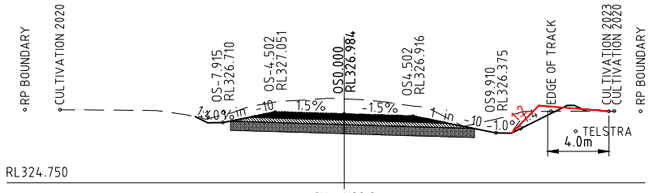
A1

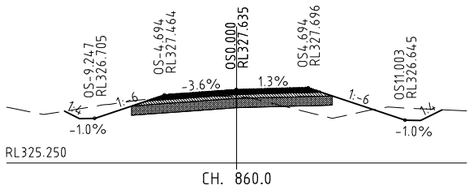
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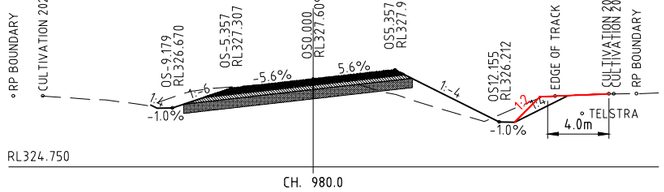
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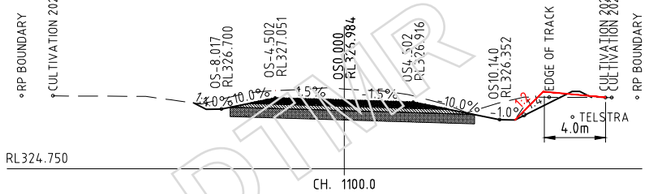


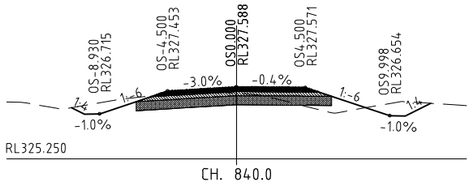


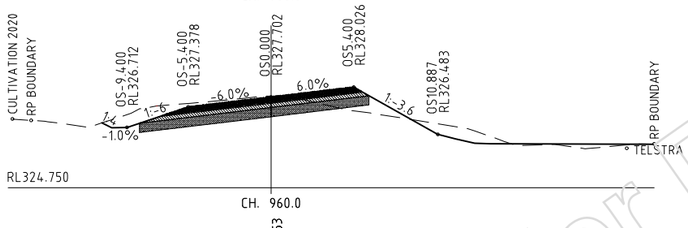


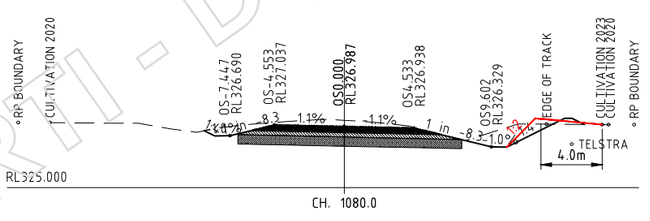


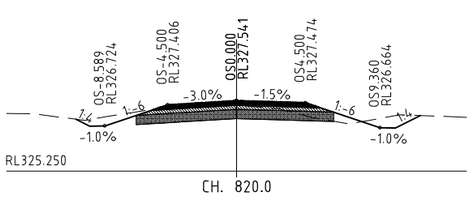


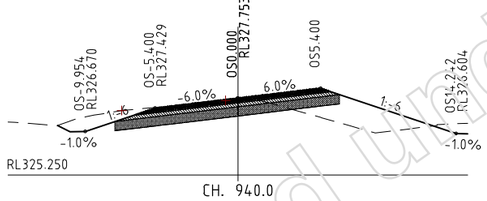


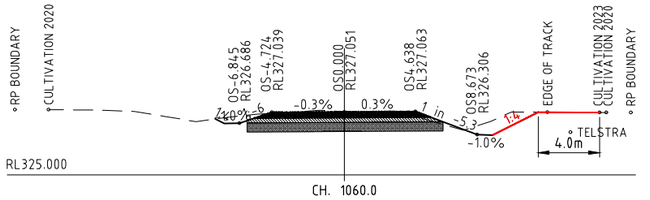


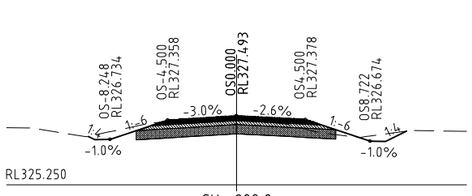


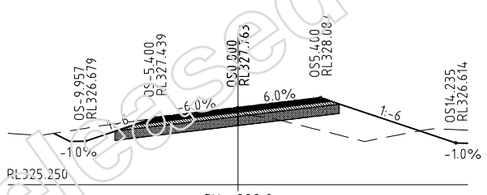


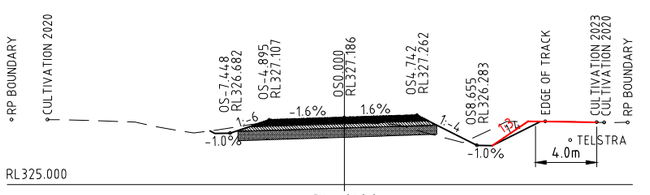


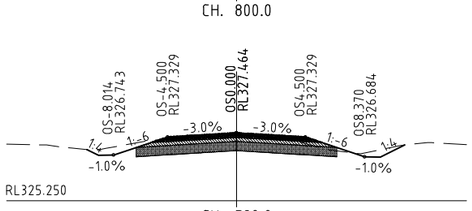


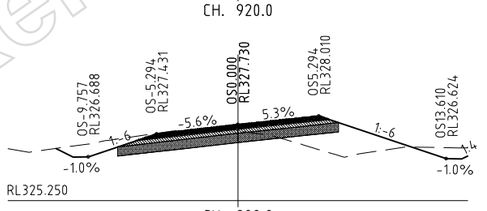


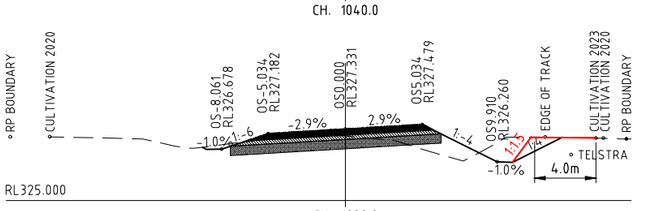












Released under RII - DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		5	05.05.23	AS BUILT	JAG	PN	PML	SW
		4	01.02.23	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		3	08.09.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11	2	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-DAT-00059	LAYOUT SHEET 1 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

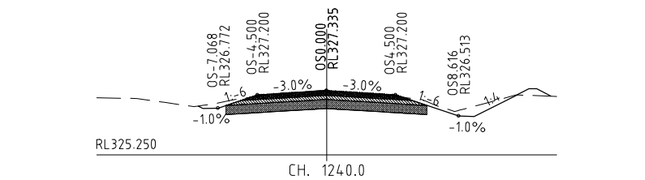
arrow energy go further

STATUS	ASB
CONTRACTOR DWG No.	201237 C142
SITE	S00
PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED
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SCALE	AS SHOWN
REV	5
	A1

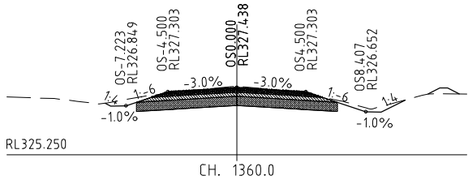
SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 3 OF 11

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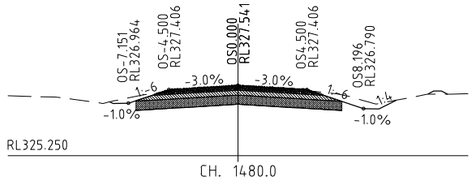
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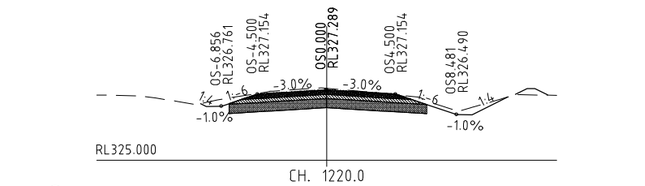
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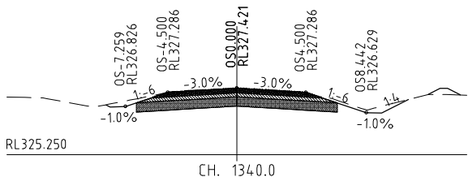
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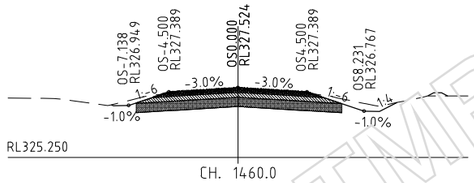
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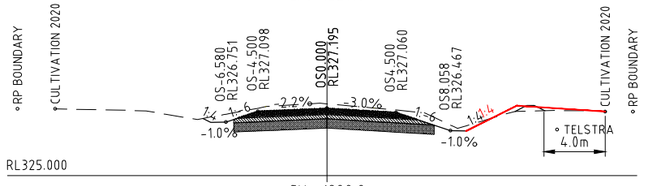
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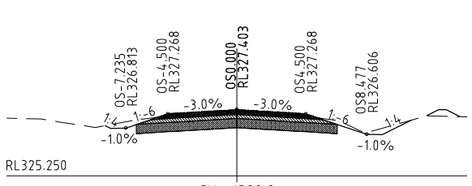
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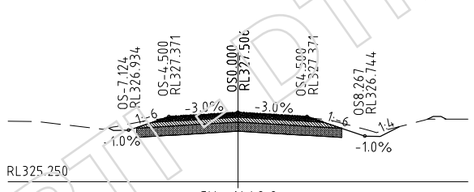
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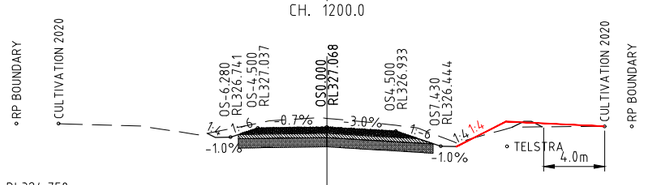
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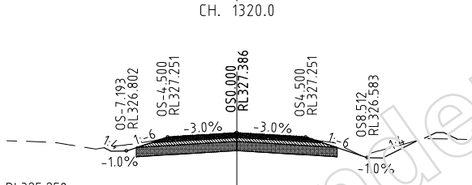
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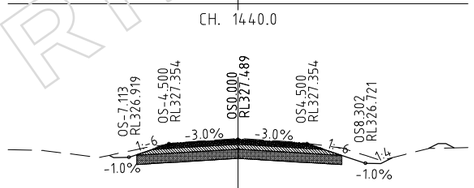
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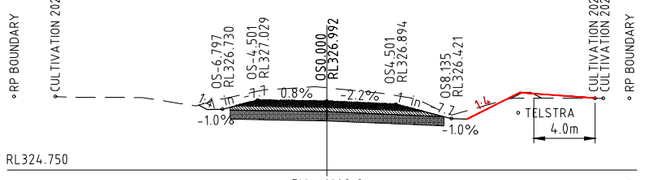
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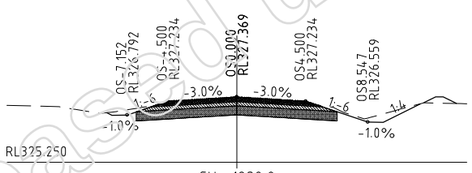
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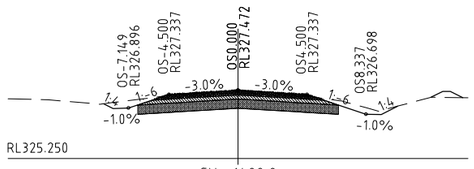
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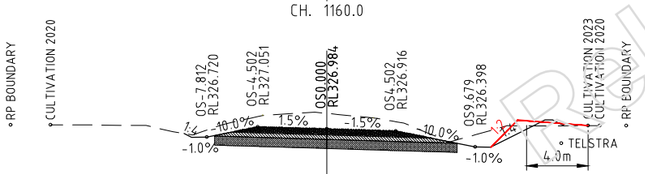
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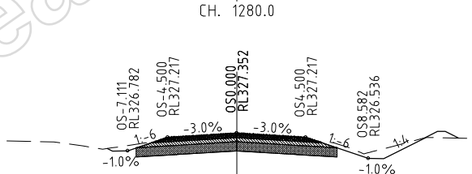
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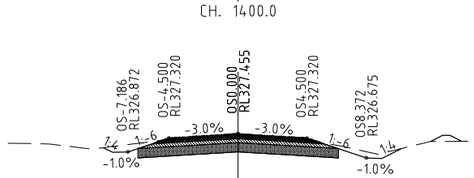
CH. 1400.0



CH. 1140.0



CH. 1260.0



CH. 1380.0

Released under RTI DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		5	05.05.23	AS BUILT	JAG	PN	PML	SW
		4	03.02.23	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		3	01.02.23	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11	2	08.09.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

STATUS ASB

CONTRACTOR DWG No. 201237 C143

DRAWING No. S00B01-ARW-CIV-CRS-00037

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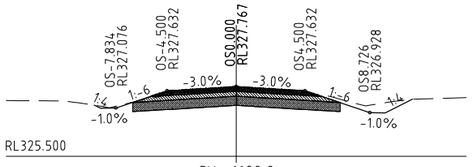
REV 5

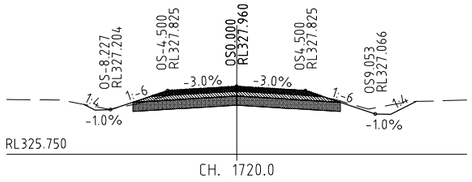
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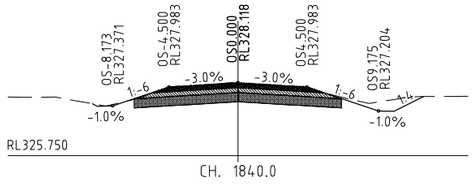
SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 4 OF 11

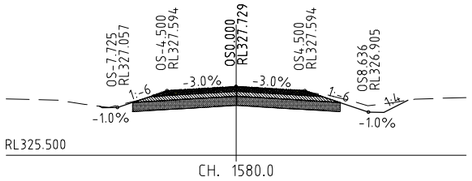
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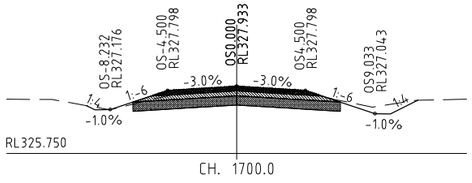
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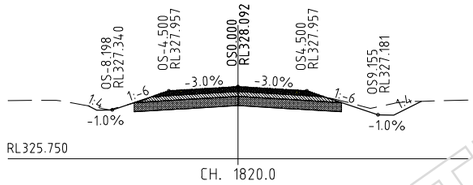


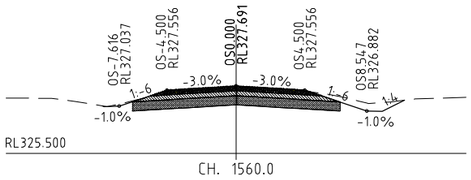


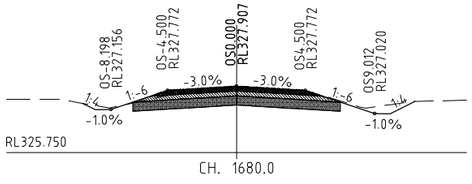


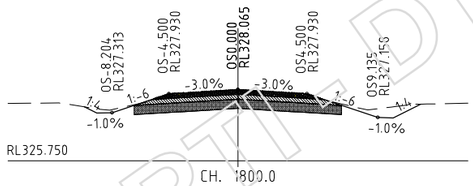


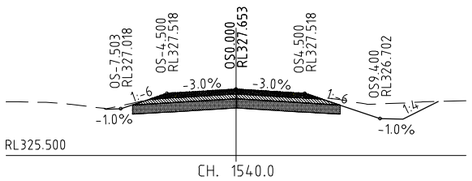


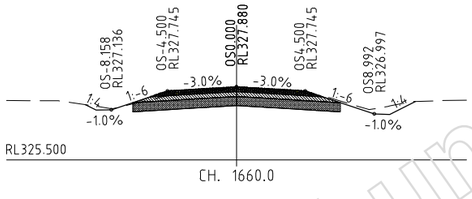


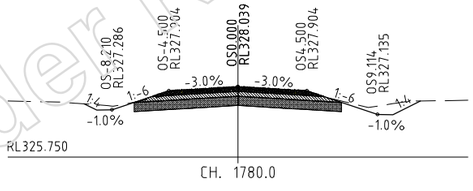


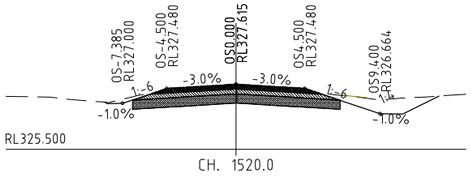


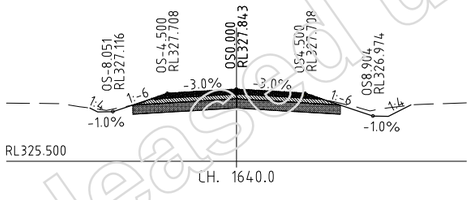


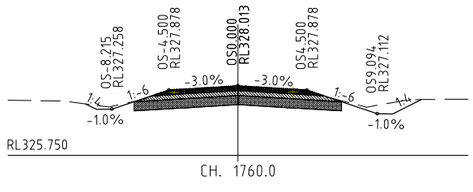


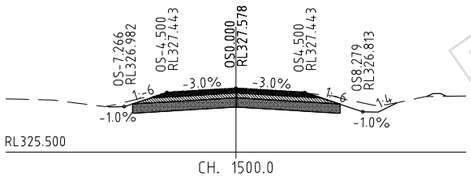


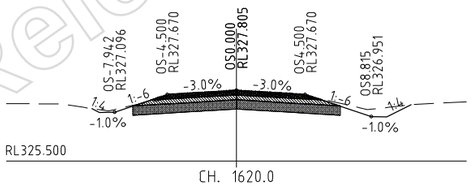


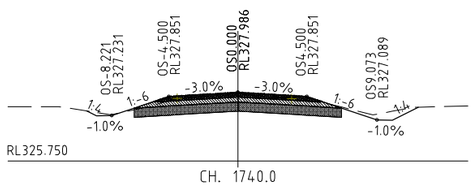












Released under RTI DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00039	CROSS SECTIONS SHEET 6 OF 11	2	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11	1	08.09.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

TATUS

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

ASB

arrow energy go further

CONTRACTOR DWG No. 201237 C144

SITE S00

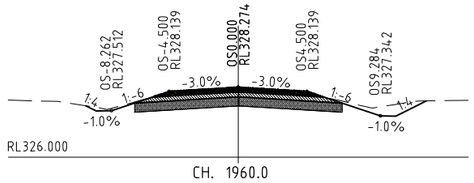
PLANT B01

SECURITY CLASSIFICATION RESTRICTED

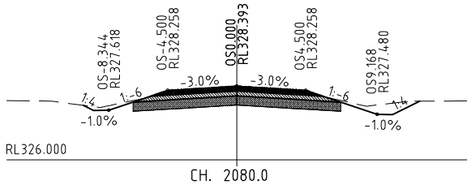
DRAWING No. S00B01-ARW-CIV-CRS-00038

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 5 OF 11

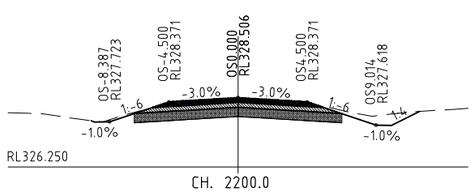
SCALE AS SHOWN | REV 2 | A1



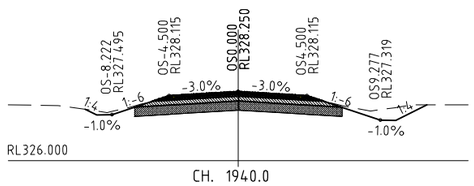
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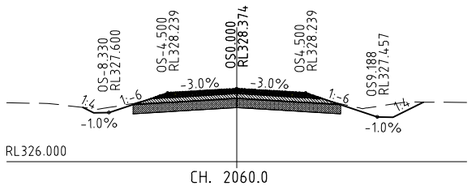
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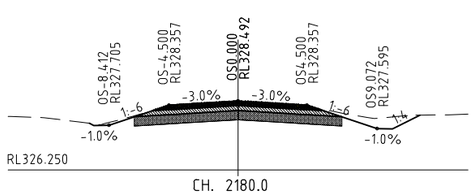
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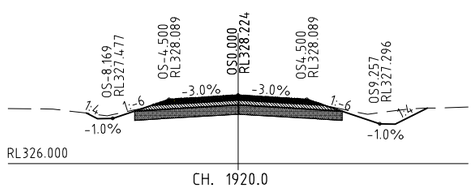
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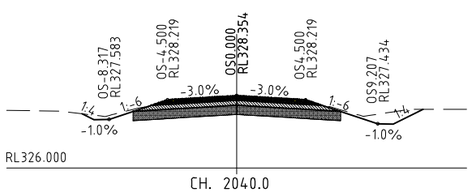
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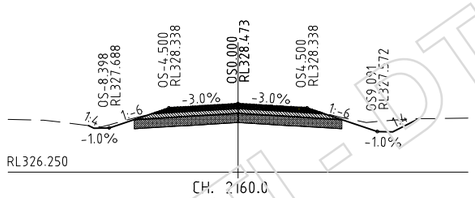
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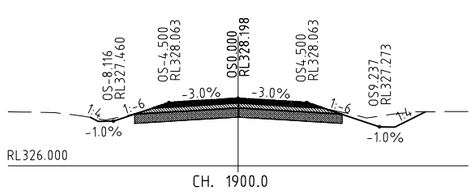
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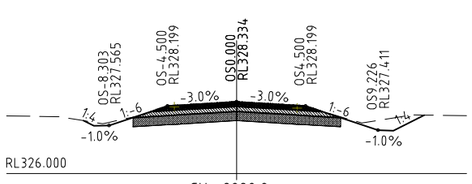
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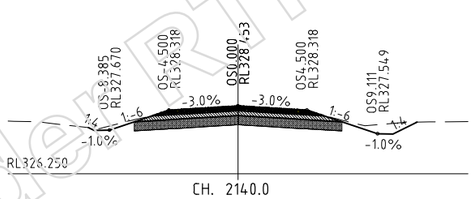
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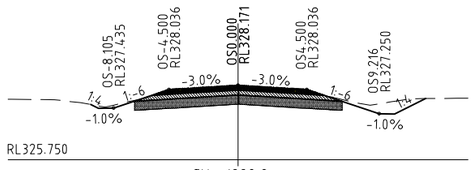
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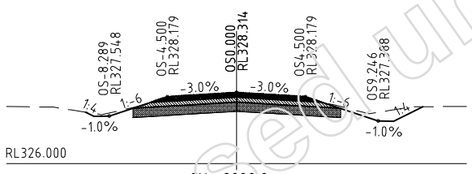
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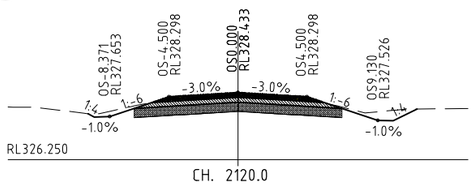
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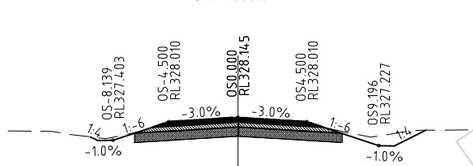
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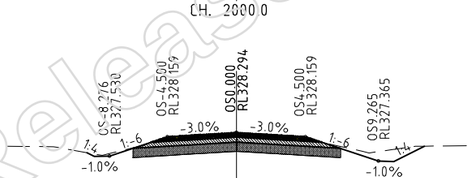
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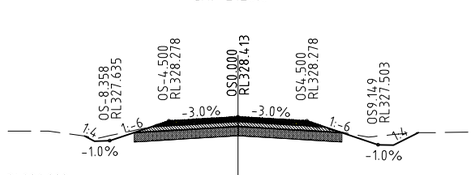
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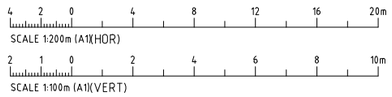


CH. 1980.0



CH. 2100.0

Released under RTI - DTMR



The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date:

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00040	CROSS SECTIONS SHEET 7 OF 11	1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT" NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C145

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

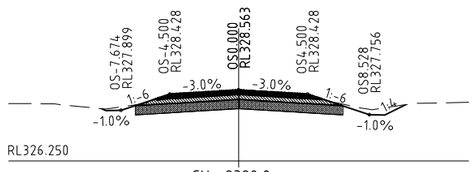
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 6 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00039

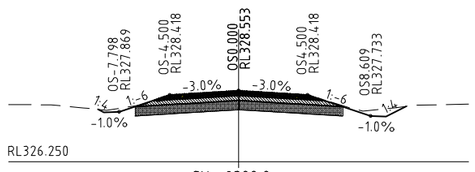
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REV 1

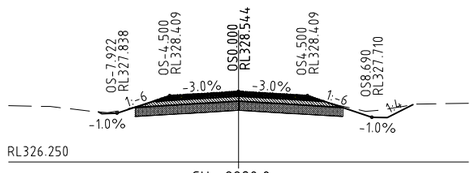
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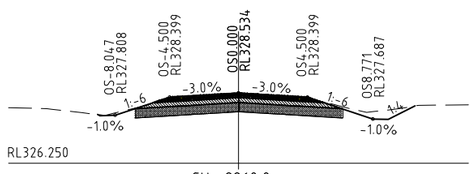
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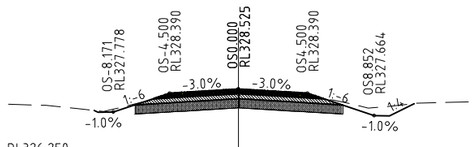
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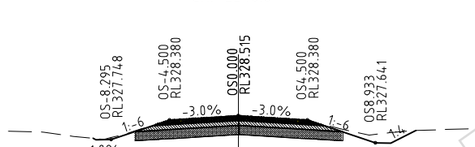
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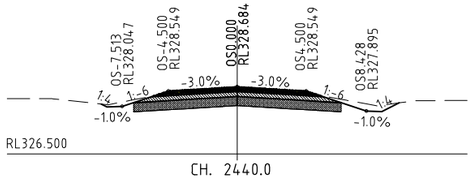
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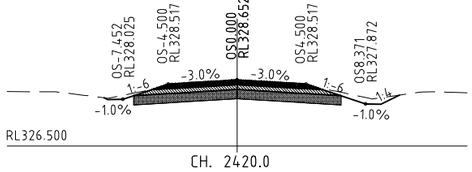
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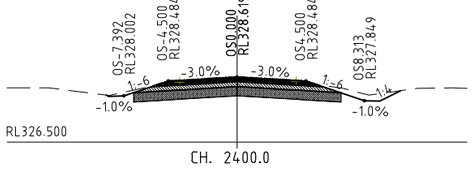
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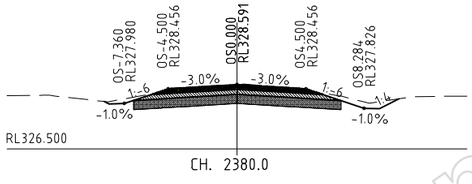
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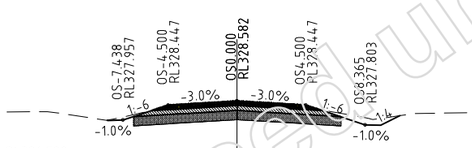
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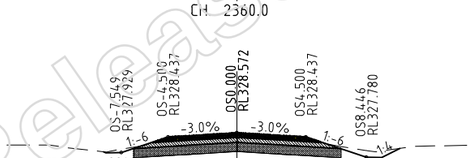
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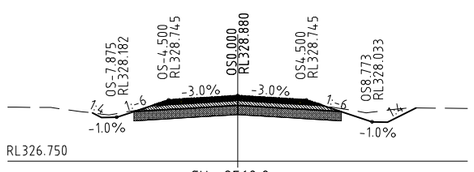
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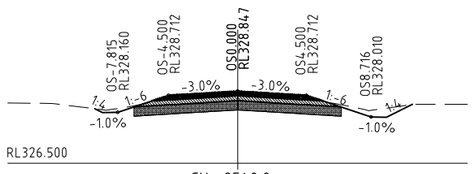
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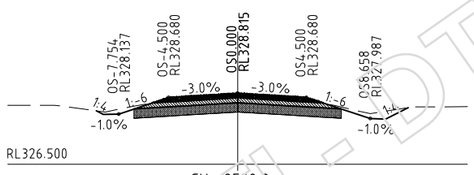
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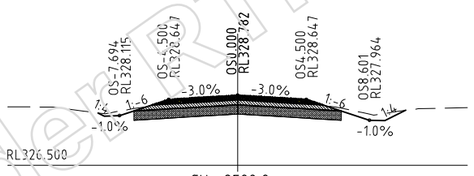
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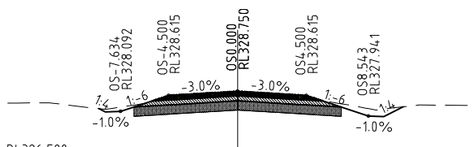
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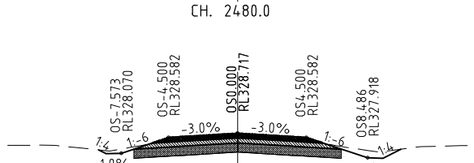
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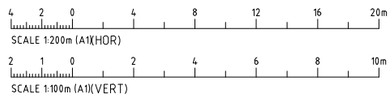
CH. 2500.0



CH. 2480.0



CH. 2460.0



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The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00041	CROSS SECTIONS SHEET 8 OF 11	1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-CRS-00039	CROSS SECTIONS SHEET 6 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

STATUS

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

ASB

arrow energy go further

CONTRACTOR DWG No. 201237 C146

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 7 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00040

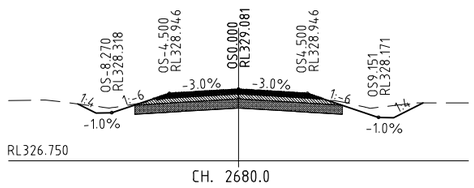
SCALE AS SHOWN

REV 1

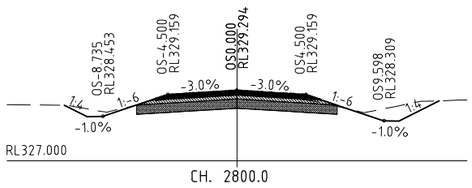
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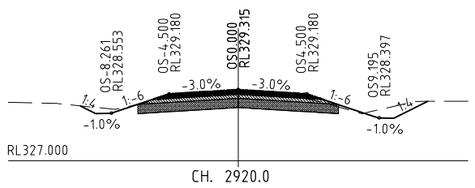
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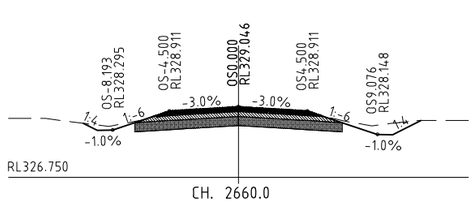
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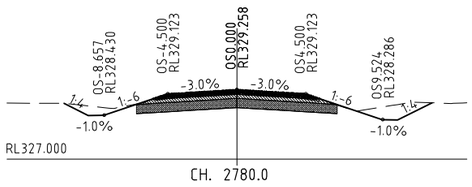
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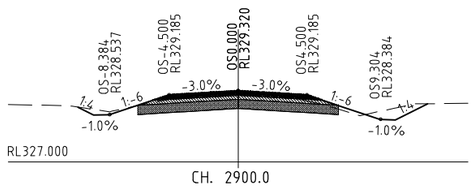
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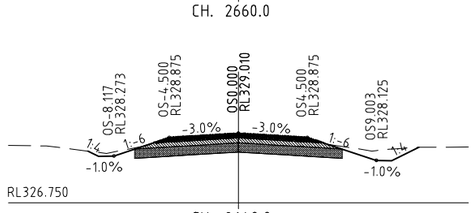
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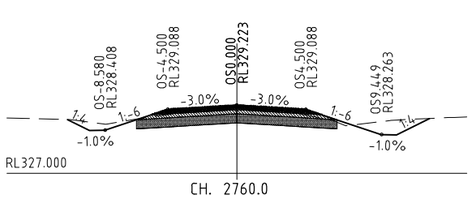
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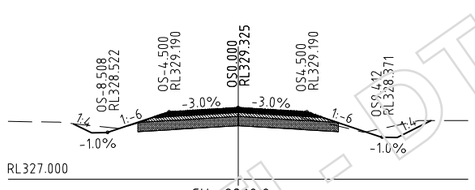
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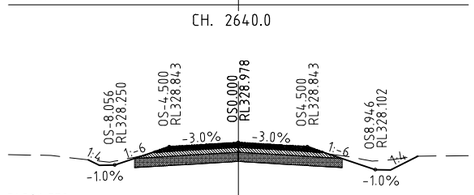
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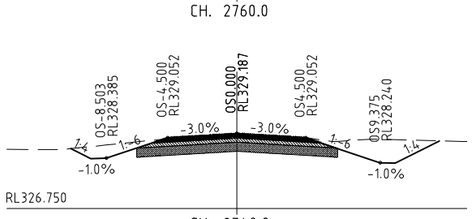
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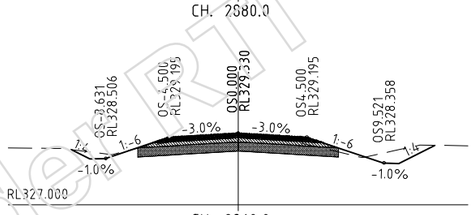
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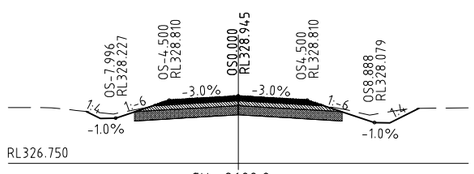
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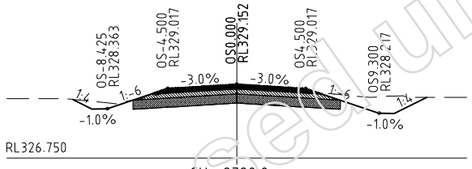
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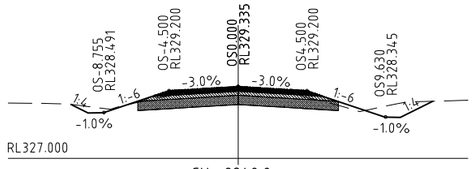
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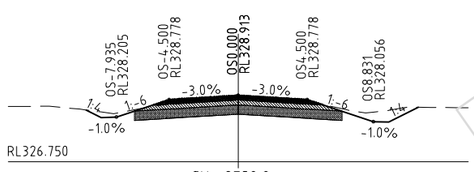
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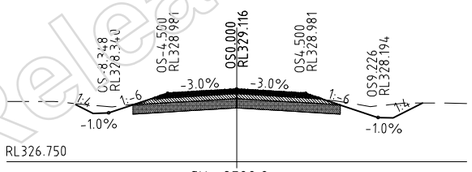
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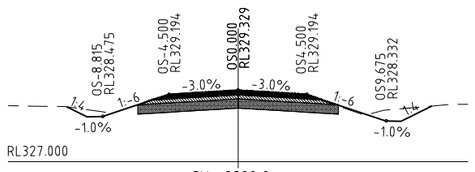
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CH. 2580.0



CH. 2700.0



CH. 2820.0

Released under RTI - DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
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S00B01-ARW-CIV-CRS-00040	CROSS SECTIONS SHEET 7 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C147

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

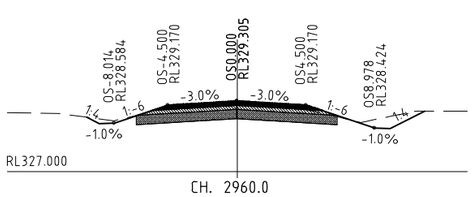
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 8 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00041

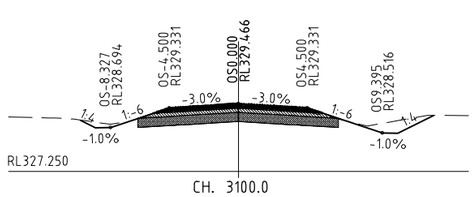
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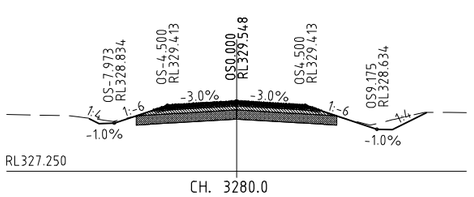
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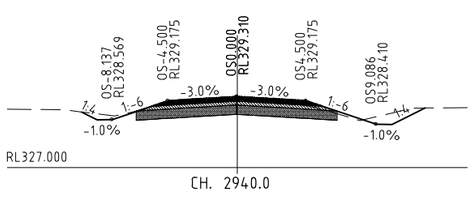
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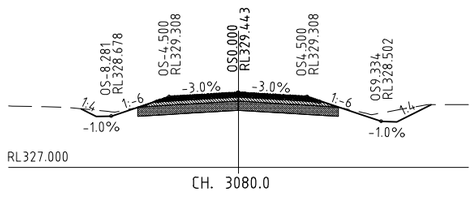
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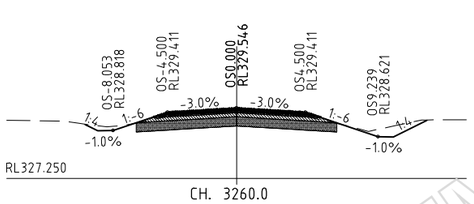
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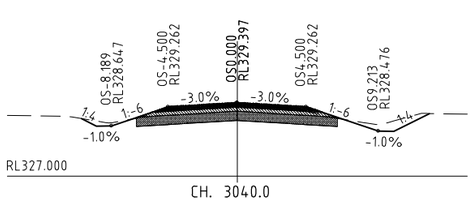
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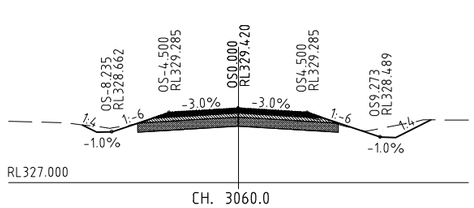
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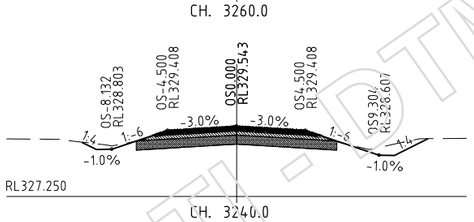
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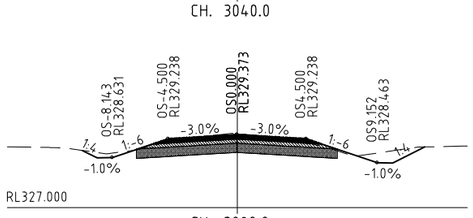
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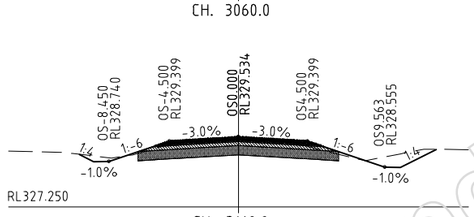
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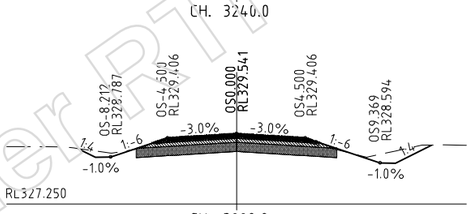
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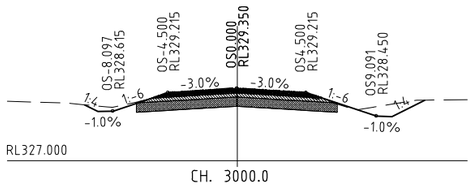
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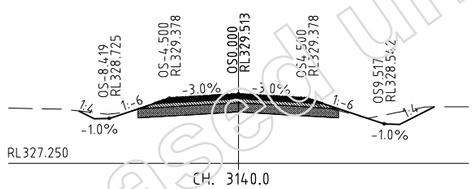
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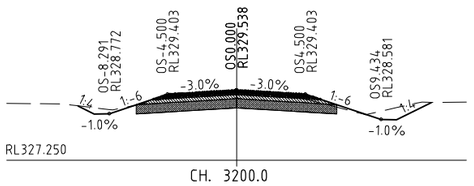
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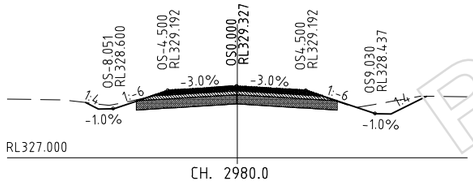
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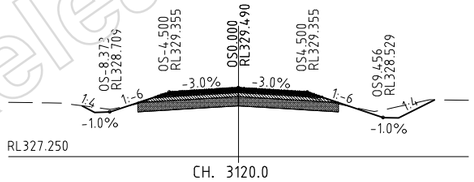
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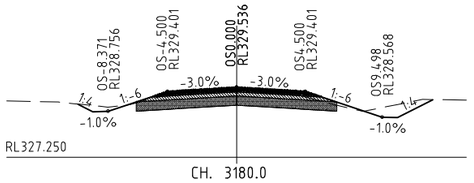
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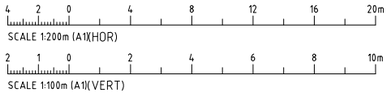
CH. 2980.0



CH. 3120.0



CH. 3180.0



Released under RTI - DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	05.05.23	AS BUILT	JAG	PN	PML	SW
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S00B01-ARW-CIV-CRS-00041	CROSS SECTIONS SHEET 8 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C148

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 9 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00042

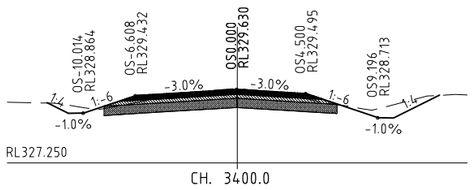
SCALE AS SHOWN

REV 2

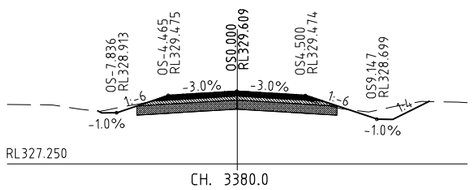
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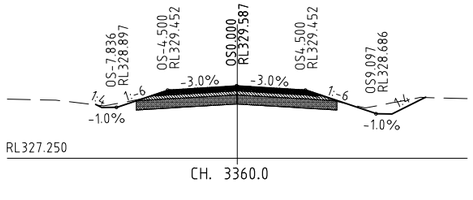
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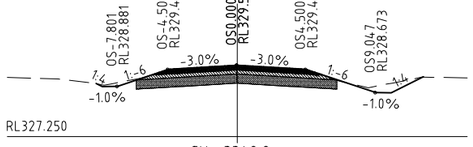
CH. 3400.0



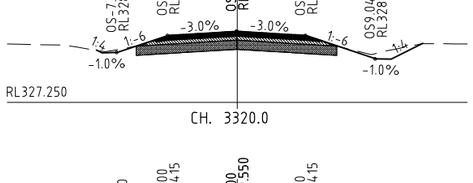
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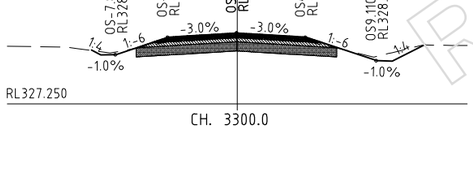
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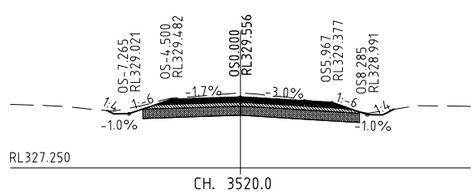
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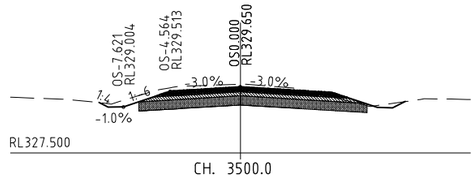
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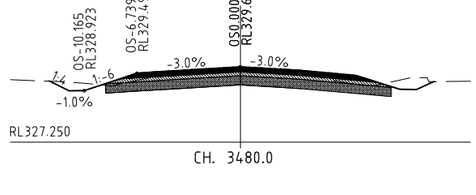
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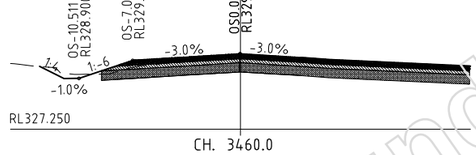
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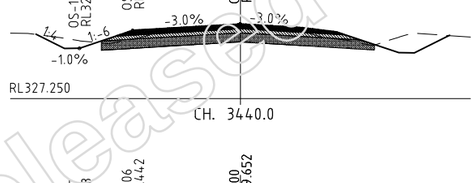
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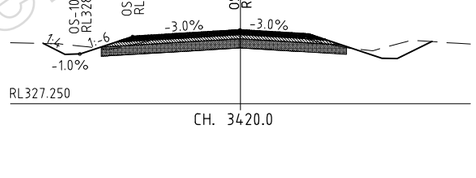
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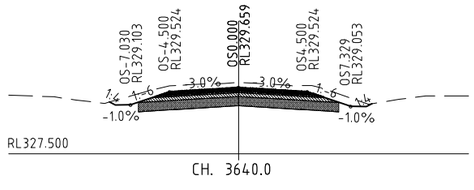
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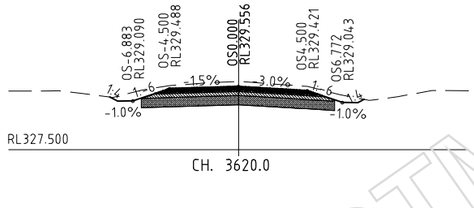
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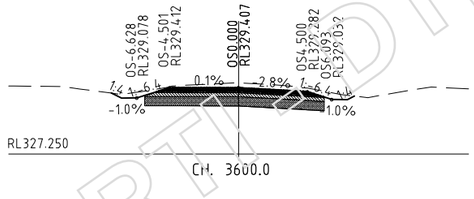
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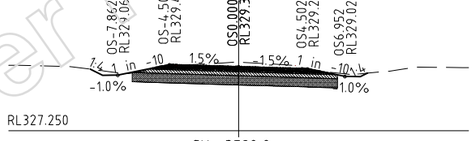
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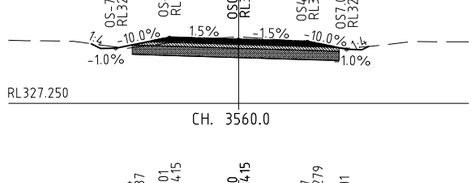
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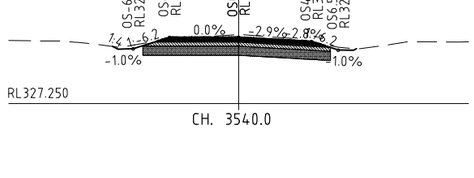
CH. 3600.0



CH. 3580.0



CH. 3560.0



CH. 3540.0

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Full Name: NR

Position Title:

Date: 05/05/2023

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S00B01-ARW-CIV-CRS-00042	CROSS SECTIONS SHEET 9 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

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SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 10 OF 11

STATUS ASB

CONTRACTOR DWG No. 201237 C149

DRAWING No. S00B01-ARW-CIV-CRS-00043

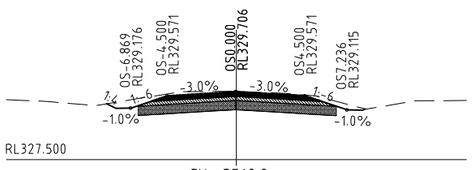
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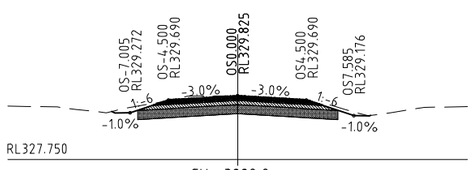
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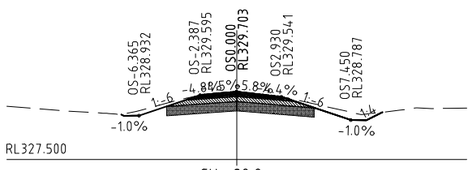
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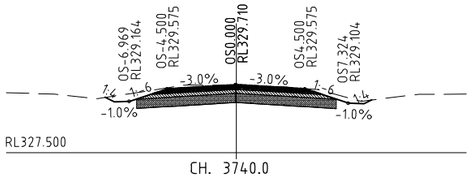
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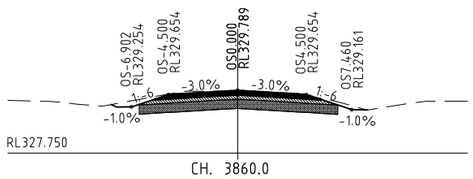
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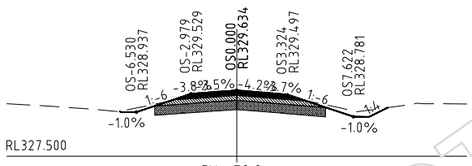
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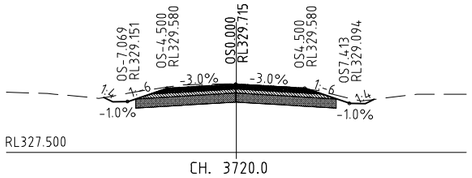
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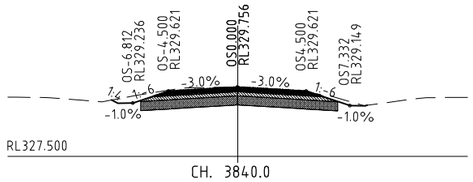
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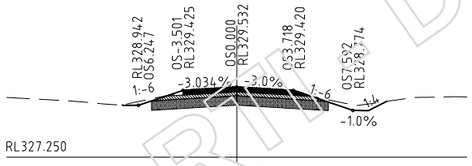
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CH. 3720.0

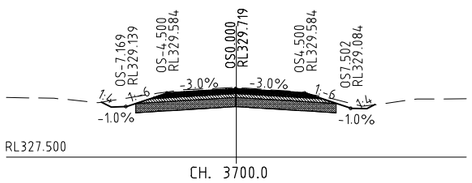


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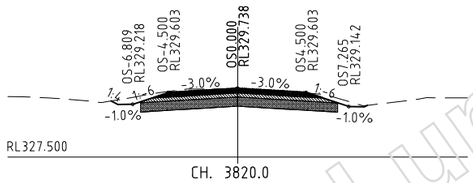


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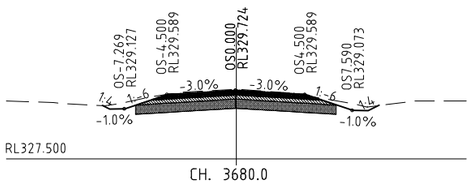
THETEN ROAD



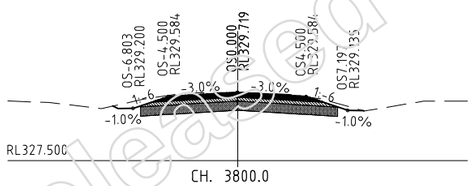
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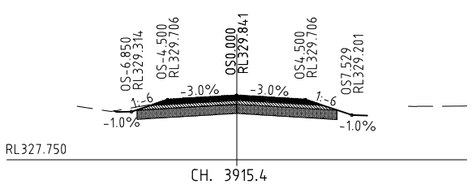
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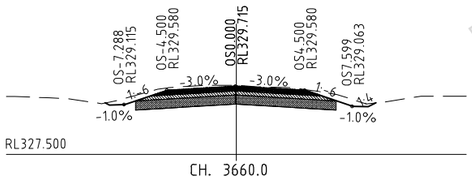
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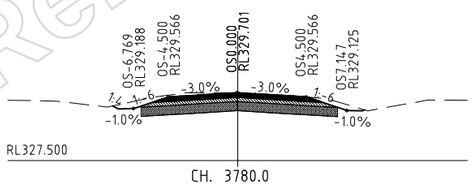
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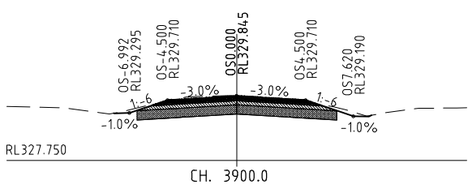
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CH. 3660.0



CH. 3780.0



CH. 3900.0

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Full Name: NR

Position Title:

Date: 05/05/2023

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		1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
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S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

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SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

STATUS ASB

CONTRACTOR DWG No. 201237 C150

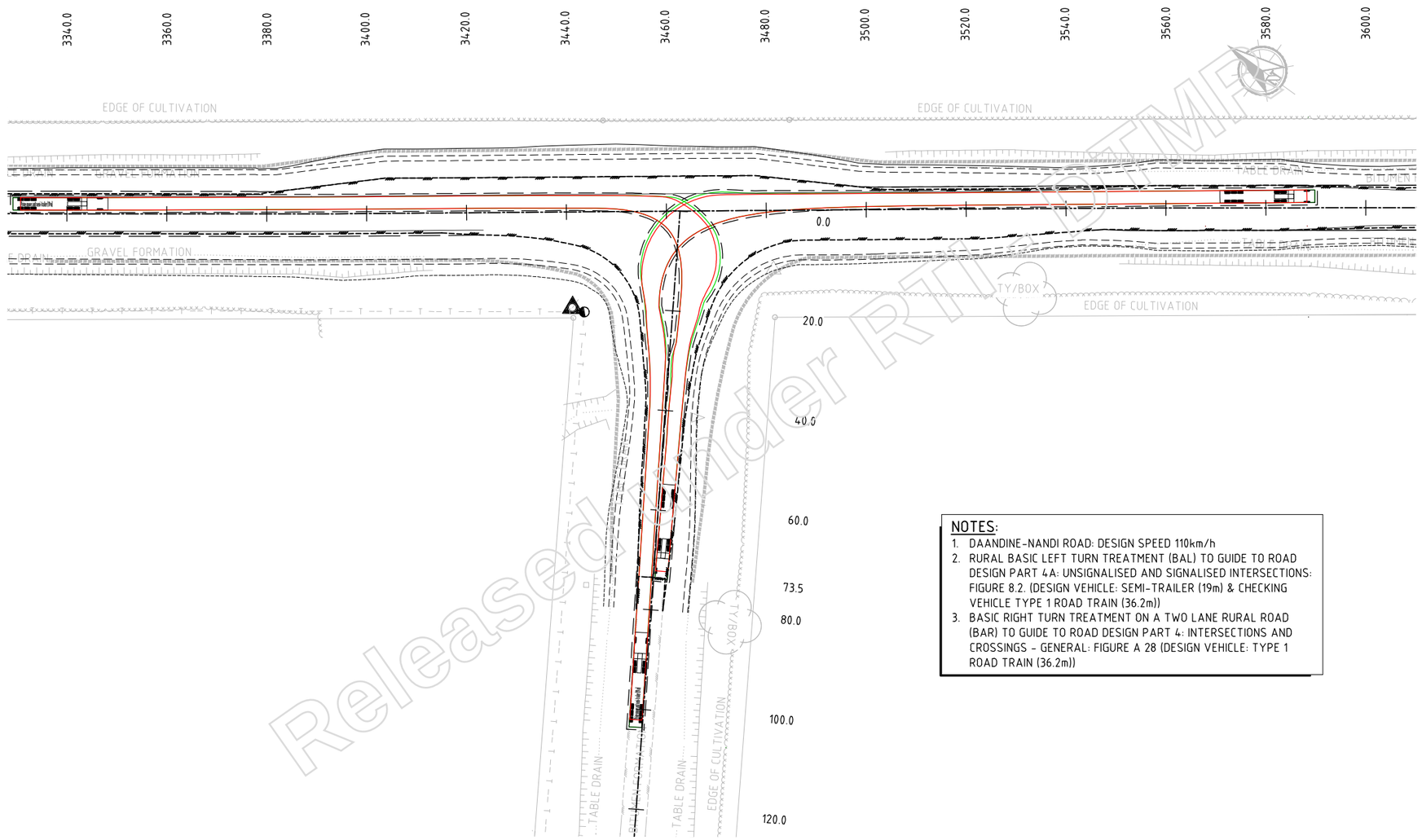
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SCALE AS SHOWN

REV 2

A1

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 11 OF 11



Released under RTI

NOTES:

1. DAANDINE-NANDI ROAD: DESIGN SPEED 110km/h
2. RURAL BASIC LEFT TURN TREATMENT (BAL) TO GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS: FIGURE 8.2. (DESIGN VEHICLE: SEMI-TRAILER (19m) & CHECKING VEHICLE TYPE 1 ROAD TRAIN (36.2m))
3. BASIC RIGHT TURN TREATMENT ON A TWO LANE RURAL ROAD (BAR) TO GUIDE TO ROAD DESIGN PART 4: INTERSECTIONS AND CROSSINGS - GENERAL: FIGURE A 28 (DESIGN VEHICLE: TYPE 1 ROAD TRAIN (36.2m))

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

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Date: 03.06.21

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PLANT B01

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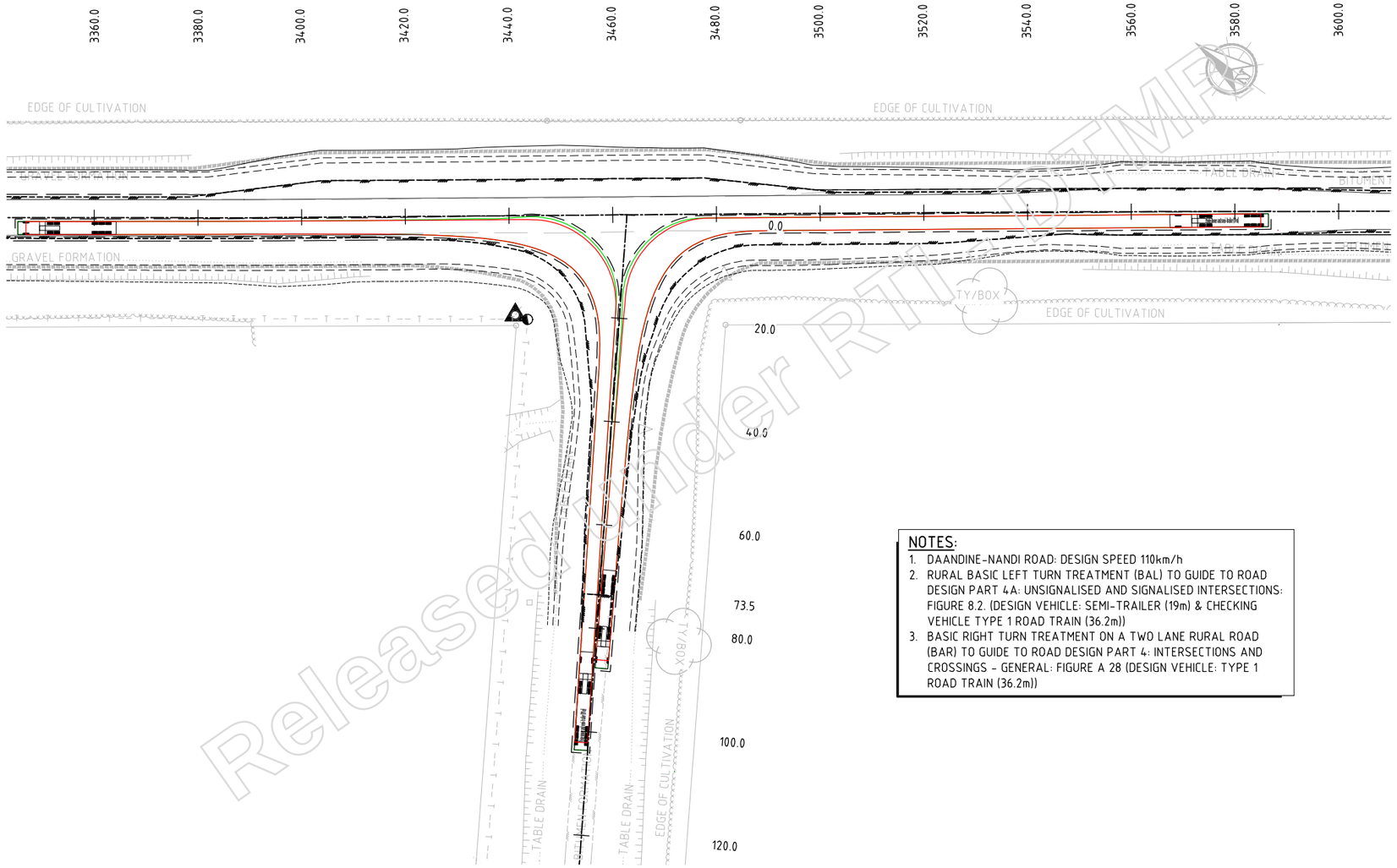
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
VEHICLE SWEPT PATHS LAYOUT SHEET 1 OF 2

DRAWING No. S00B01-ARW-CIV-LAY-00056

SCALE 1:500m

REV 1

A1



Released under RTI - DTMR

NOTES:
1. DAANDINE-NANDI ROAD: DESIGN SPEED 110km/h
2. RURAL BASIC LEFT TURN TREATMENT (BAL) TO GUIDE TO ROAD DESIGN PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS: FIGURE 8.2. (DESIGN VEHICLE: SEMI-TRAILER (19m) & CHECKING VEHICLE TYPE 1 ROAD TRAIN (36.2m))
3. BASIC RIGHT TURN TREATMENT ON A TWO LANE RURAL ROAD (BAR) TO GUIDE TO ROAD DESIGN PART 4: INTERSECTIONS AND CROSSINGS - GENERAL: FIGURE A 28 (DESIGN VEHICLE: TYPE 1 ROAD TRAIN (36.2m))

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

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RPEQ CERTIFICATION
Signature "OMITTED FROM AS BUILT"
NR
Date: 03.06.21

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STATUS ASB

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SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
VEHICLE SWEPT PATHS LAYOUT SHEET 2 OF 2

DRAWING No. S00B01-ARW-CIV-LAY-00057

SCALE 1:500m

REV 1

A1

SETOUT - CONTROL LINE SECTION 1 VERTICAL POINTS

PT	CHAINAGE	HEIGHT	GRADE	K VALUE	RADIUS	LENGTH
CT	60.936	327.911	-0.10%			
IP 5	61.412	327.910				
TC	75.125	327.865	-0.30%			
IP 6	140.867	327.647		305.00	30500.000	131.483
CT	206.608	327.713	0.10%			
IP 7	226.293	327.733				
IP 8	389.076	327.578				
IP 9	490.774	327.459				
IP 10	560.537	327.525				
IP 11	665.770	327.392				
IP 12	790.250	327.470				
TC	903.033	327.738	0.20%			
IP 13	948.861	327.846		95.30	9530.000	91.657
CT	994.690	327.514	-0.70%			
TC	1049.767	327.115	-0.70%			
IP 14	1067.884	326.984		50.00	5000.000	36.233
CT	1086.000	326.984	0.00%			
TC	1151.000	326.984	0.00%			
IP 15	1167.383	326.984		50.00	5000.000	32.766
CT	1183.766	327.091	0.70%			
TC	1194.272	327.160	0.70%			
IP 16	1218.076	327.316		83.60	8360.000	47.607
CT	1241.879	327.336	0.10%			
IP 17	1481.082	327.542				
IP 18	1659.555	327.880				
IP 19	1953.145	328.268				
IP 20	2187.469	328.500				
IP 21	2384.080	328.593				
IP 22	2641.464	329.013				
IP 23	2825.198	329.338				
IP 24	2961.004	329.305				
IP 25	3157.607	329.534				
IP 26	3328.391	329.554				
TC	3461.815	329.697	0.10%			
IP 27	3500.349	329.738		83.60	8360.000	77.067
CT	3538.882	329.424	-0.80%			
TC	3541.706	329.401	-0.80%			
IP 28	3549.853	329.335		20.00	2000.000	16.294
CT	3558.000	329.335	0.00%			
TC	3583.000	329.335	0.00%			
IP 29	3591.180	329.335		20.00	2000.000	16.361
CT	3599.361	329.402	0.80%			
TC	3604.692	329.445	0.80%			
IP 30	3639.821	329.732		83.60	8360.000	70.259
CT	3674.950	329.725	0.00%			
IP 31	3780.590	329.701				
IP 32	3842.756	329.759				
IP 33	3892.631	329.847				
IP 34	3915.400	329.841				

SETOUT - CONTROL LINE SECTION 1 HORIZONTAL POINTS

PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH
IP 3	60.000	304640.172	7000434.889	327.911			
IP 4	356.677	304600.356	7000140.896	327.609			
IP 5	677.085	304556.537	6999823.498	327.399			
TC	747.214	304546.826	6999754.045	327.443	187°57'36.39"		
IP 6	794.996	304540.208	6999706.719	327.481		R = 3000.000	95.564
CT	842.778	304532.087	6999659.628	327.595	189°47'06.92"		
TS	847.082	304531.355	6999655.387	327.605	189°47'06.92"		
SC	907.082	304524.951	6999595.827	327.746	178°50'13.26"	L = 60.000	
IP 7	940.911	304514.705	6999558.843	327.752		R = -157.000	67.658
CS	974.740	304540.633	6999530.549	327.638	154°08'45.16"	L = 60.000	
ST	1034.740	304573.394	6999480.398	327.224	143°11'51.50"		
TC	1152.475	304643.924	6999386.127	326.984	143°11'51.50"		
IP 8	1172.311	304655.806	6999370.245	327.029		R = 5000.000	39.671
CT	1192.146	304667.562	6999354.268	327.146	143°39'08.04"		
IP 9	1527.950	304866.589	6999083.800	327.631			
IP 10	1676.366	304954.032	6998963.880	327.902			
IP 11	2031.145	305163.437	6998677.492	328.345			
IP 12	2714.300	305567.618	6998126.731	329.142			
IP 13	2861.373	305653.950	6998007.662	329.329			
IP 14	3294.797	305910.349	6997658.212	329.550			
IP 15	3388.942	305965.672	6997582.036	329.618			
IP 16	3501.715	306032.711	6997491.353	329.644			
IP 17	3553.325	306063.318	6997449.798	329.340			
IP 18	3619.939	306102.564	6997395.973	329.556			
IP 19	3738.337	306172.547	6997300.471	329.710			
IP 20	3915.400	306277.614	6997157.951	329.841	143°36'07.18"		

SETOUT - CONTROL LINE THETEN ROAD No RCBC HORIZONTAL POINTS

PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING
IP 1	0.000	306009.540	6997522.697		238°09'46.35"
IP 2	80.000	305941.576	6997480.496	329.702	

SETOUT - CONTROL LINE THETEN ROAD No RCBC VERTICAL POINTS

PT	CHAINAGE	HEIGHT	GRADE	K VALUE	RADIUS	LENGTH
IP 1	0.001	329.697				
IP 2	4.049	329.576				
TC	11.381	329.393	-2.50%			
IP 3	26.381	329.018		7.39	738.820	30.000
CT	41.381	329.252	1.60%			
TC	53.008	329.433	1.60%			
IP 4	63.008	329.589		22.38	2237.490	20.000
CT	73.008	329.656	0.70%			
IP 5	80.000	329.703				

FOR BENCHMARK SITE-COORDINATES, DATUM AND OTHER SURVEY INFORMATION REFER TO DWG S00B01-ARW-CIV-SUR-00014

Released for Information DTMR

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-LAY-00054	LAYOUT SHEET 6 OF 6	1	05.05.23	AS BUILT	JAG	PN	PML	SW
S00B01-ARW-CIV-LAY-00049	LAYOUT SHEET 1 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

Date: 03.06.21

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C170

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CONTROL LINE SETOUT DETAILS

DRAWING No. S00B01-ARW-CIV-DET-00059

SCALE

REV 1

A1

SEDIMENT & EROSION CONTROL NOTES

GENERAL

1. THE EROSION & SEDIMENT CONTROL MEASURES SHOWN ARE THE MINIMUM REQUIREMENTS TO BE INSTALLED UPON COMPLETION OF THE WORKS. THE CONTRACTOR SHALL INSTALL ADDITIONAL MEASURES AS REQUIRED TO TAKE ACCOUNT OF CONSTRUCTION ACTIVITIES & SEQUENCING. NOT WITHSTANDING, THE SUPERVISING ENGINEER MAY DIRECT ADDITIONAL MEASURES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE ENVIRONMENTAL PROTECTION ACT (1994) & ANY SITE OR PROJECT SPECIFIC REQUIREMENTS ISSUED BY THE LOCAL COUNCIL UNDER THE SUSTAINABLE PLANNING ACT (2009).

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION

3. THE CONTRACTOR SHALL PREPARE AN EROSION & SEDIMENT CONTROL MANAGEMENT PLAN (E&SCP) & SUBMIT TO THE SUPERVISING ENGINEER FOR APPROVAL.
4. WRITTEN APPROVAL IS TO BE OBTAINED FROM DOWNSTREAM LANDOWNERS FOR TEMPORARY DISCHARGE OF RUNOFF ONTO ADJOINING LAND.
5. PROGRAM CONSTRUCTION ACTIVITIES SO AS TO MINIMISE DISTURBANCE TO EXISTING VEGETATION COVER.
6. CONSTRUCTION OF AN ENTRY/EXIT POINT TO THE SITE SHOULD BE PROVIDED SO THAT SEDIMENT IS NOT TRACKED OFF SITE. REFER I.P.W.E.A.Q. STD. DWG. D-0040 (ALTERNATIVE 1 PREFERRED). DESIGNATED PARKING AREAS TO BE ESTABLISHED DURING CONSTRUCTION CLEAR OF TRAFFIC LANES AND PROPERTY ACCESSES.
7. ALL MEASURES TO BE OPERATIONAL BEFORE COMMENCEMENT OF UP-SLOPE EARTHWORKS.

BULK EARTHWORKS

8. TOPSOIL SHOULD BE STOCKPILED ON SITE FOR LATER USE.
9. WHERE PRACTICABLE MAINTAIN VEGETATION IN A HEALTHY STATE DURING THE CONSTRUCTION PROCESS.
10. WHEN UP-SLOPE WATER IS DIVERTED AROUND A WORK SITE IT IDEALLY SHOULD BE DISCHARGED AS SHEET FLOW THROUGH AN UNDISTURBED AREA.

CONSTRUCTION OPERATIONS

11. ERODABLE MATERIAL MISTAKENLY PLACED WITHIN THE ROAD RESERVE (INCLUDING ACCIDENTAL SPILLAGE & TRACKING OF SUCH MATERIALS ONTO THE ROAD) THAT CANNOT BE PREVENTED THROUGH REASONABLE MEANS MUST BE:
    (a) REMOVED IMMEDIATELY IF RAINFALL IS IMMINENT OR OCCURRING.
    (b) REMOVED PRIOR TO THE END OF THE DAY'S WORK IF RAINFALL IS NOT EXPECTED.
12. MATERIALS SHOULD BE SWEPT FROM THE ROAD, NOT WASHED DOWN THE GUTTER.
13. ALL SOLID WASTE SHOULD BE STORED ON SITE IN SUCH A MANNER THAT IS PREVENTED FROM LEAVING THE SITE EITHER BY THE ACTION OF WIND OR WATER.
14. SMALLER MATERIALS, SUCH AS LITTER, SHOULD BE CONTAINED IN COVERED BINS.

STOCKPILES

15. STOCKPILES ARE NOT BE STORED WITHIN THE ROAD RESERVE, UNLESS APPROVED BY COUNCIL.
16. WHERE NECESSARY STOCKPILE LOSSES CAN BE MINIMIZED WITH THE USE OF COVERS.
17. ALL STOCKPILES & BUILDING MATERIAL SHOULD BE LOCATED WITHIN THE SEDIMENT CONTROL ZONE.
18. TO MINIMIZE EROSION & THE LOSS OF SAND & SOIL, STOCKPILES SHOULD NOT BE LOCATED WITHIN AN OVERLAND FLOW PATH. IF IT IS IMPRACTICAL TO AVOID STORMWATER RUNOFF BEING DIRECTED TO A STOCKPILE, THEN A PERIMETER BANK SHOULD BE CONSTRUCTED UP-SLOPE OF THE STOCKPILE TO DIRECT RUNOFF IN A CONTROLLED MANNER AROUND THE STOCKPILE.
19. STOCKPILES TO HAVE MAXIMUM 1(V):6(H) SIDE BATTERS.

DRAINAGE

DIVERSION DRAINS / BANKS

20. WHERE PRACTICAL OR WHERE STORMWATER RUNOFF FROM MORE THAN 0.5Ha FEEDS INTO THE WORK SITE, DIVERT UP-SLOPE WATER AROUND THE DISTURBED AREA USING CATCH DRAINS OR PERIMETER BANKS. LINE HIGH VELOCITY DRAINS WITH ROCK, TURF OR GEOTEXTILE TO AVOID UNNECESSARY EROSION.

SEDIMENT BARRIERS

SEDIMENT FENCES

23. INSTALL SEDIMENT FENCE(S) ALONG THE LOW SIDE OF THE SITE & IDEALLY ALONG THE LINE OF CONSTANT LAND LEVEL TO PREVENT THE CONCENTRATION OF STORMWATER RUNOFF. MAXIMUM CATCHMENT AREA 0.6Ha PER 100m LENGTH OF FENCE. IN AREAS WHERE IT IS EITHER UNDESIRABLE OR IMPRACTICAL TO BURY THE LOWER EDGE OF THE SEDIMENT FENCE, THE LOWER 200mm (MIN.) PORTION OF THE FABRIC SHOULD BE PLACED ON THE GROUND UP SLOPE OF THE FENCE & BURIED UNDER A 100mm (MIN.) LAYER OF AGGREGATE REFER I.P.W.E.A.Q. STD. DWG. D-0040. WOVEN FABRICS ARE PREFERRED HOWEVER NON-WOVEN FABRICS MAY BE USED ON SMALL WORK SITES WHERE OPERATIONAL PERIOD IS LESS THAN 6 MONTHS OR ON SITES WHERE SIGNIFICANT RUNOFF IS NOT EXPECTED. STRAWBALE SEDIMENT FENCES SHOULD NOT BE USED UNLESS OTHER OPTIONS ARE NOT AVAILABLE.

EROSION CONTROL BLANKETS

24. USE EROSION CONTROL BLANKETS OR MATTING ON SOILS WITH A HIGH EROSION RISK, ON BATTERS GREATER THAN 1(V):4(H) & / OR WHERE THERE IS A LIKELIHOOD OF DELAY IN COMPLETING PERMANENT EROSION CONTROL MEASURES. REFER MANUFACTURER FOR ADVICE ON MOST SUITABLE PRODUCT FOR EACH SITE.

REHABILITATION

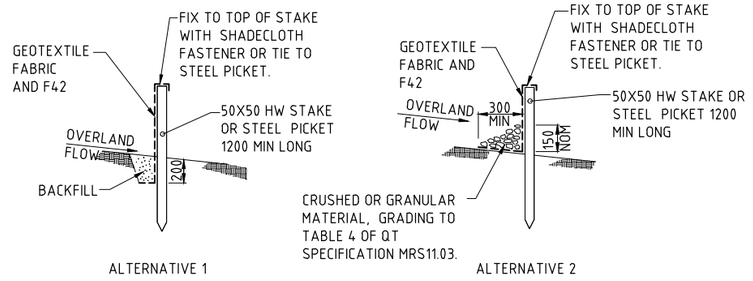
GRASS SEEDING & TURFING

25. ALL DISTURBED AREAS ARE TO BE SEEDED, & / OR TURFED, WITHIN SEVEN DAYS OF FINAL TRIMMING & TOPSOILING. SEED MIX TO BE CONFIRMED WITH SUPERVISING ENGINEER.
26. WATERING OF GRASS SEEDED AREAS SHALL BE CARRIED OUT AT THE FOLLOWING FREQUENCIES TO ACHIEVE A 75% STRIKE OVER THE ENTIRE AREA.
    (a) WEEK 1 - ONCE EVERY DAY
    (b) WEEKS 2 TO 4 - ONCE EVERY SECOND DAY
    (c) WEEKS 5 TO 12 - TWICE EVERY WEEK
    (d) WEEKS 13 TO 26 - ONCE EVERY WEEK

    ONE WATERING SHALL BE DEFINED AS 5L/m^2 OF WATER IN NOT LESS THAN ONE HOUR. WATER SHALL BE APPLIED USING A FINE SPRAY.

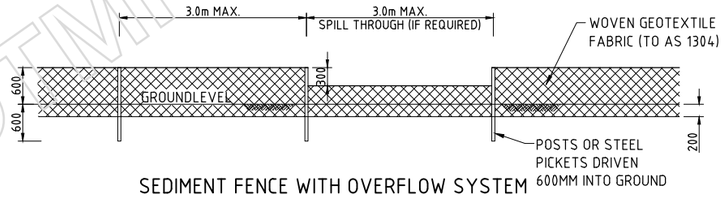
MAINTENANCE

27. SEDIMENT FENCES SHOULD BE REPLACED IF THE FABRIC IS RIPPED OR OTHERWISE DAMAGED. THE MAINTENANCE OF THE SEDIMENT FENCES INCLUDES THE REMOVAL OF SEDIMENT DEPOSITED UP-SLOPE OF THE FENCE & RETRENCHING THE FABRIC WHEN THE FENCE IS 25% FULL.
28. AS A GUIDE SEDIMENT CONTROL DEVICES SHOULD BE INSPECTED AS FOLLOWS:
    (a) WEEKLY DURING DRY WEATHER.
    (b) PRIOR TO PREDICTED STORM EVENTS.
    (c) TWICE DAILY DURING PROLONGED RAIN.
    (d) DURING & AFTER MAJOR STORM EVENTS.
29. THE CONTRACTOR SHALL MAINTAIN ALL SEDIMENT CONTROL DEVICES FOR THE FULL EXTENT OF THE CONSTRUCTION PERIOD & DEFECTS LIABILITY PERIOD (IF SPECIFIED).
30. ALL DRAINAGE & TEMPORARY EROSION & SEDIMENT CONTROL MEASURES ARE TO REMAIN IN PLACE UNTIL EITHER:
    (a) PERMANENT MEASURES HAVE BEEN CONSTRUCTED & FOUND TO BE EFFECTIVE.
    (b) 75% OF THE GROUND COVER OVER THE DISTURBED AREA HAS BEEN RE-ESTABLISHED .
    (c) NOTICE IS GIVEN BY SUPERVISING ENGINEER FOR REMOVAL.



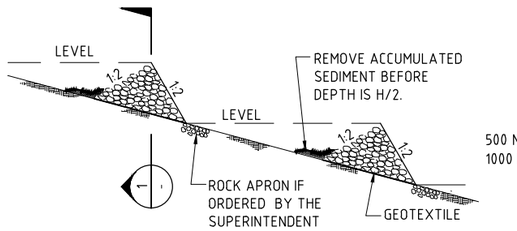
SEDIMENT FENCE SECTIONS

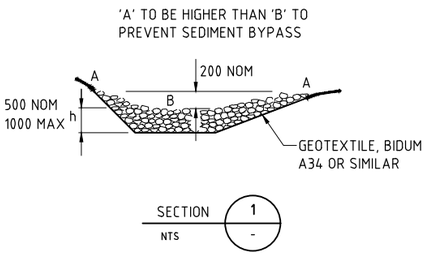
N.T.S



SEDIMENT FENCE WITH OVERFLOW SYSTEM

N.T.S





ROCK CHECK DAMS - FLOW CONTROL

N.T.S

The works shown on this drawing are a factual representation of the works constructed.

Full Name: NR

Position Title:

Date: 05/05/2023

Signed (if wet ink):

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		1	05.05.23	AS BUILT	JAG	PN	PML	SW
		0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Signature "OMITTED FROM AS BUILT"

NR

Date: 03.06.21

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS ASB

CONTRACTOR DWG No. 201237 C180

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
EROSION AND SEDIMENT CONTROL DETAILS

DRAWING No. S00B01-ARW-CIV-DET-00060

SCALE N.T.S.

REV 1

A1

Released under RTI - DTMR

brandon & ASSOCIATES
ENGINEERING CONSULTANTS
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CHINCHILLA | ROMA | TOOWOOMBA
Trustee For The Brandon & Associates Unit Trust
A.C.N. 010 461 113 A.B.N. 98 903 123 870

Enq: NR - Toowoomba
NR brandoneng.com

4 June 2021

Department of Transport & Main Roads
Locked Bag 1
WARWICK QLD 4370

Attention: Mr Jeff Lavey (via email jeffrey.j.lavey@tmr.qld.gov.au)

SURAT INFRASTRUCTURE - ROAD UPGRADE SGP STAGE 1
DAANDINE – NANDI ROAD SECTION 1 CH. 0 – 3.5km

On behalf of our client Arrow Energy Pty Ltd, please find attached the following information in relation to the proposed roadworks upgrade for the above-mentioned project:

- ❑ Brandon & Associates Drawings for Daandine Nandi Road Section 1 Job No. 201237 (Refer transmittal)

The attached drawings reflect the pavement design report which was approved 23/3/21 and incorporate the comments provided by Mr Jeff Lavey via email 29/4/21 and 11/5/21. The updated pavement design report detailing the lime content for the subgrade stabilisation has been forwarded under separate cover. The attached drawings reflect this report.

Yours faithfully

NR

NR
Design Office Manager

CC. NR
Arrow Energy Pty Ltd
GPO Box 5262
Brisbane Qld 4001
Via email: NR @arrowenergy.com.au

Released under RTI - DTMR

brandon & ASSOCIATES
ENGINEERING CONSULTANTS
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CHINCHILLA | ROMA | TOOWOOMBA
Trustee For The Brandon & Associates Unit Trust
A.C.N. 010 461 113 A.B.N. 98 903 123 870

Enq: NR - Toowoomba
NR brandoneng.com

Released under RTI - DTMR

4 June 2021

Department of Transport & Main Roads
Locked Bag 1
WARWICK QLD 4370

Attention: Mr Jeff Lavey (via email jeffrey.j.lavey@tmr.qld.gov.au)

SURAT INFRASTRUCTURE - ROAD UPGRADE SGP STAGE 1
DAANDINE – NANDI ROAD SECTION 1 CH. 0 – 3.5km
DAANDINE – NANDI ROAD SECTION 3 CH. 7.9 – 11.8km

Further to the preliminary pavement design report submitted 8/3/21, please find attached a revised pavement design report prepared by our subconsultant HIG for the above-mentioned projects (Ref: P10646 Issue 2 dated 31/5/21). This report has been updated to include the additional lime demand testing.

We would appreciate if you could review the report and provide any further feedback at your earliest convenience.

Yours faithfully

NR
NR
Design Office Manager

CC. NR
Arrow Energy Pty Ltd
GPO Box 5262
Brisbane Qld 4001
Via email NR @arrowenergy.com.au

Document Transmittal Form

Project Daandine Nandi Road Section 1 Ch. 0 - 3.5km
Job No. 201237

Client Arrow Energy Pty Ltd
Address Level 39 / 111 Eagle Street Brisbane
GPO Box 5262 Brisbane Qld 4001
Attention NR

From Brandon & Associates Pty Ltd
Address Level 1 / 218 Anzac Avenue, Toowoomba
Contact NR
Phone

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ENGINEERING CONSULTANTS
personal. professional. practice

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TRANSMITTAL RECORD

Original - To be distributed with documents	DAY	4									
Duplicate - To be held on job file	MONTH	6									
	YEAR	21									

B&A REFERENCE No.	ARROW DOCUMENT No.	DOCUMENT TITLE									
201237 C000	S00B01-ARW-CIV-DET-00056	Locality Plan	0								
201237 C101	S00B01-ARW-CIV-SUR-00014	Survey Sheet 1 of 6	0								
201237 C102	S00B01-ARW-CIV-SUR-00015	Survey Sheet 2 of 6	0								
201237 C103	S00B01-ARW-CIV-SUR-00016	Survey Sheet 3 of 6	0								
201237 C104	S00B01-ARW-CIV-SUR-00017	Survey Sheet 4 of 6	0								
201237 C105	S00B01-ARW-CIV-SUR-00018	Survey Sheet 5 of 6	0								
201237 C106	S00B01-ARW-CIV-SUR-00019	Survey Sheet 6 of 6	0								
201237 C110	S00B01-ARW-CIV-LAY-00049	Layout Sheet 1 of 6	0								
201237 C111	S00B01-ARW-CIV-LAY-00050	Layout Sheet 2 of 6	0								
201237 C112	S00B01-ARW-CIV-LAY-00051	Layout Sheet 3 of 6	0								
201237 C113	S00B01-ARW-CIV-LAY-00052	Layout Sheet 4 of 6	0								
201237 C114	S00B01-ARW-CIV-LAY-00053	Layout Sheet 5 of 6	0								
201237 C115	S00B01-ARW-CIV-LAY-00054	Layout Sheet 6 of 6	0								
201237 C116	S00B01-ARW-CIV-LAY-00055	Theten Road Intersection Layout	0								
201237 C120	S00B01-ARW-CIV-DET-00057	Typical Cross Sections and Details	0								
201237 C121	S00B01-ARW-CIV-DET-00058	Drainage Details	0								
201237 C130	S00B01-ARW-CIV-LSN-00029	Longitudinal Section Control Line RS01 Sheet 1 of 7	0								
201237 C131	S00B01-ARW-CIV-LSN-00030	Longitudinal Section Control Line RS01 Sheet 2 of 7	0								
201237 C132	S00B01-ARW-CIV-LSN-00031	Longitudinal Section Control Line RS01 Sheet 3 of 7	0								
201237 C133	S00B01-ARW-CIV-LSN-00032	Longitudinal Section Control Line RS01 Sheet 4 of 7	0								
201237 C134	S00B01-ARW-CIV-LSN-00033	Longitudinal Section Control Line RS01 Sheet 5 of 7	0								
201237 C135	S00B01-ARW-CIV-LSN-00034	Longitudinal Section Control Line RS01 Sheet 6 of 7	0								
201237 C136	S00B01-ARW-CIV-LSN-00035	Longitudinal Section Control Line RS01 Sheet 7 of 7	0								
201237 C140	S00B01-ARW-CIV-CRS-00034	Cross Sections Control Line RS01 Sheet 1 of 11	0								
201237 C141	S00B01-ARW-CIV-CRS-00035	Cross Sections Control Line RS01 Sheet 2 of 11	0								
201237 C142	S00B01-ARW-CIV-CRS-00036	Cross Sections Control Line RS01 Sheet 3 of 11	0								
201237 C143	S00B01-ARW-CIV-CRS-00037	Cross Sections Control Line RS01 Sheet 4 of 11	0								
201237 C144	S00B01-ARW-CIV-CRS-00038	Cross Sections Control Line RS01 Sheet 5 of 11	0								
201237 C145	S00B01-ARW-CIV-CRS-00039	Cross Sections Control Line RS01 Sheet 6 of 11	0								
201237 C146	S00B01-ARW-CIV-CRS-00040	Cross Sections Control Line RS01 Sheet 7 of 11	0								
201237 C147	S00B01-ARW-CIV-CRS-00041	Cross Sections Control Line RS01 Sheet 8 of 11	0								
201237 C148	S00B01-ARW-CIV-CRS-00042	Cross Sections Control Line RS01 Sheet 9 of 11	0								
201237 C149	S00B01-ARW-CIV-CRS-00043	Cross Sections Control Line RS01 Sheet 10 of 11	0								
201237 C150	S00B01-ARW-CIV-CRS-00044	Cross Sections Control Line RS01 Sheet 11 of 11	0								
201237 C160	S00B01-ARW-CIV-LAY-00056	Vehicle Swept Paths Sheet 1 of 2	0								
201237 C161	S00B01-ARW-CIV-LAY-00057	Vehicle Swept Paths Sheet 2 of 2	0								
201237 C170	S00B01-ARW-CIV-DET-00059	Control Line Setout Details	0								
201237 C180	S00B01-ARW-CIV-DET-00060	Erosion and Sediment Control Details	0								
	S00B01-ARW-CIV-REP-00004	Pavement Design Report									
	S00B01-ARW-CIV-REP-00021	Safety in Design Report									
	S00B01-ARW-CIV-REP-00022	Design Exception Report									
	S00B01-ARW-CIV-BUD-00006	Estimate of Construction Cost									
	S00B01-ARW-CIV-MTO-00010	BOQ									
	S00B01-ARW-CIV-SPR-00006	Specifications									
	S00B01-ARW-CIV-REP-00029	Gap Analysis Report									

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Arrow DC										

ISSUE STATUS

O-Original / Construction **P**-Preliminary / Draft **C** - Concept	O									

REASON FOR ISSUE

A-As constructed **C**-Construction **I**-Internal Review **R**-External Review &/or Approval **T**-Tender	C									

MEDIUM ISSUED

O-Original Print **C**-Copy Print **P**-Pdf Format **N**-Native File Format **X**-Other	P									

DRAWING SIZE

F-Full Size **S**-Scaled Reduction	S									

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RELEASED FOR CONSTRUCTION IRRIGATION TO DTMR

Daandine – Nandi Road Upgrade Section 1
Design Review

Scheme Delivered:

A. Transmittal Form
B. Preliminary Plans - Section 1 (C101 – C180)

The following comments:

1. Type Section

C120 – Type Section

9 November 2020 Review

Design Criteria Notes 3, 4 and 9 provide information proposed within the design but there are numerous locations where these have not been achieved. Provide engineering advice, or Design Exception Report to justify non-conformance.

Section 1 Sheet 2 of 2 – add CH2735 LHS to the list.

Section 1 Sheet 2 of 2 – Section A not provided on plan.

15 April 2021 Review

Design Notes 3, 4 & 9 appear to be satisfied through appropriate signage (similar to existing situation), appropriate superelevation and sufficient lengths of sag curves. Issue CLOSED.

Std Dwg 1807 covers the access construction. There is no longer a Sheet 2. Issue CLOSED.

2. Horizontal

9 November 2020 Review

Layout plan 1 of 6 table drain and diversion drain graded out – demonstrate / indicate if these drains will work. Much of the new table drain will be below the associated farming land and finding an outlet as proposed may not be possible.

15 April 2021 Review

Table drains are graded as best as possible – many areas have extreme flat areas and most likely will hold water – similar to the current situation. Issue CLOSED.

9 November 2020 Review

CH920 – CH980 indicates potential for works in private property (LHS) – confirm if property owner has agreed to this.

15 April 2021 Review

CH920 – CH960 indicates potential for works in private property (LHS) – confirm if property owner has agreed to this.

14 May 2021 Review

Email response:

Released under RTI - DTMR

"The preliminary design Issue P3 showed this curve as 100km/hr design speed with R190 and 3% superelevation. Both the table drain interface line and the clear zone extended into private property. The horizontal alignment as shown on the most recent Issue A drawings is based on a design speed of 80km/hr (70 km/hr posted) with a R157 and 6% superelevation. Dwg C112 shows the clear zone extending into private property however the table drain interface is just inside the road reserve. The property boundary shown is based on best fit overlay of the DCDB. There are no existing fences along the eastern side of the road at this location.

Note that the floodway has been moved approx. 60m to the south so that it is outside the limits of the superelevation of the curve (which is opposite to the direction of flow on the floodway) however the same floodway levels have been maintained."

Based on the above design modifications – the design fits within the known road reserve and will be acceptable. Issue CLOSED.

9 November 2020 Review

Radius 190 CH893 – CH1040 for the design speed of 100 km/h (Truck) has a friction of 0.384. Superelevation crossfall is designed to 3%. The recommended max friction is 0.12 – vehicles may roll over at 0.35. Indicate measures to improve safety. Signage and warning signs to be added.

15 April 2021 Review

Radius 157m CH840 – CH1040 for the design speed of warning advisory of 70km/h (car) has a friction of 0.18. Warning advisory sign of 60 km/ h would be more suitable. Superelevation is designed to 6%. For a truck 60km/h friction will be 0.121 – appears this will work. Issue CLOSED.

9 November 2020 Review

Section 1 CH3498 ends – demonstrate the tapers needed to merge back with the existing road.

15 April 2021 Review

1:50 tapers provided. Issue CLOSED.

3. Aquaplaning

9 November 2020 Review

Curve CH900 - Indicate the aquaplaning flow path.

15 April 2021 Review

No aquaplaning calculations or flow paths provided.

14 May 2021 Review

Calculations provided indicate aquaplaning shouldn't be a problem. Issue CLOSED.

4. Vertical

9 November 2020 Review

There are numerous instances of inadequate lengths of curves.

15 April 2021 Review

Released under RTI - DTMR

Note 9 uses Austroads Part 3 Figure 8.9. VC lengths acceptable. Issue CLOSED.

9 November 2020 Review

Where the proposed Stage 1 CH60 construction starts the vertical heights are 150 mm above natural – demonstrate how this will match in with the existing.

15 April 2021 Review

It is assumed that the vertical alignment will join into Job Number 201214. Issue CLOSED.

5. Cross Sections

9 November 2021

Dwgs C140 – C149 - It is noted that table drains, and flat bottom drains will be installed (Reference Dwg C110) – but there are many sections in the table drains where design levels would suggest it will hold water. The recommended solutions are to outflow these into private properties – indicate if agreements have been made with property owners for this to occur.

15 April 2021 Review

Table drains are graded as best as possible – many areas have extreme flat areas and most likely will hold water – similar to the current situation. Issue CLOSED.

6. Intersections

9 November 2021 Review

Theten Road – the layout is not clear for the interpretation of the proposed design. Remove unnecessary lines and demonstrate the actual design lines. Add the vehicle swept paths.

15 April 2021 Review

Swept paths added for semi-trailer. No swept paths for check vehicle. Issue CLOSED.

7. Drainage

Provide a culvert inspection report on the existing culverts. Refer Road Drainage Manual Chapter 9 (Clause 9.2.6.2) for replacing / widening existing culverts.

a. Section 1:

9 November 2020 Review

Culvert at CH950 recommends extending – refer RDM Chapter 9 for widening / replacing culverts.

Culvert at CH2810 – indicates 3x375 RCP – refer RDM Chapter 9 for widening / replacing culverts.

Culvert at CH2820 under RHS access 450 RCP - refer RDM Chapter 9 for widening / replacing culverts.

The levels between culvert crossing at CH2810 and the access crossing would indicate that the cross drainage will need to flow west down the access – demonstrate if the flows will work. Indicate clearances to existing Telstra lines.

15 April 2021 Review

Released under RTI - DTMR

All existing culverts will be removed and replaced. Issue CLOSED.

The levels of outlet CH2810 and the interaction with the existing Telstra cable not clarified. Issue OPEN. (Construction RISK.)

14 May 2021 Review

Email response:

"The invert level of the culvert replacement is at the same level as the existing. No trenching/excavation is proposed on the downstream side of the culvert. The table drain interface is ±4m from the plotted Telstra line. No interference/impact on the Telstra line is anticipated. "

Issue CLOSED.

8. Floodways

9 November 2020 Review

The long section flooding crossing at CH1084 – CH1200 is 400 mm – 450 mm lower than the existing. Demonstrate if this will flow out on the downstream side.

15 April 2021 Review

Table drains have been graded to the culverts. Issue CLOSED.

9. Private Access / vehicle swept paths

9 November 2020 Review

Demonstrate the vehicle types expected – vehicle swept paths required on accesses and intersections.

15 April 2021 Review

Swept paths shown for Intersection only. Issue CLOSED.

10. Services

a. Gas:

9 November 2020 Review

CH3450 2x road crossing – demonstrate the cover to the mains, demonstrate any protection works required.

15 April 2021 Review

No details provided.

14 May 2021 Review

Email response:

"The depth of the gas pipelines is ±2m where it crosses Daandine-Nandi Road and ±1m under the table drain invert. On the NE side it is outside of the drain interface and does not interfere with the new construction."

Issue CLOSED.

Released under RTI - DTMR

11. Signage / Linemarking

9 November 2020 Review

Provide drawings for any new sign locations, & types.

15 April 2021 Review

It appears that linemarking is shown on all plans – although it's not very clear. Issue CLOSED. (Separate linemarking and signage plans preferred.)

COMMENTS FOR TMR PP&CM TEAM

1. Section 1 Ends CH3915.4. Section 3 Starts CH7840 and Ends CH11795. This design leaves out many sections of the existing road. Have we approved the use of road trains on the "missing links"?

NR

A/Senior Designer (Civil)

14 May 2021

Released under RTI - DTMR

Daandine – Nandi Road Upgrade Section 3
Design Review

Scheme Delivered:

A. Transmittal Form
B. Plans - Section 3 (CH7980 – CH11795)

The following comments:

1. Type Section

9 November 2020 Review

Section 3 - Sheet 1 of 2

Design Criteria Notes 3, 4 and 9 provide information proposed within the design but there are numerous locations where these have not been achieved. Provide engineering advice, or Design Exception Report to justify non-conformance.

Section 3 Sheet 2 of 2 – Section A and B not provided on plan.

a. Section 3 Sheet 2 of 2 – Type 2 – what size culvert are required, details,

   remove reference to culvert at CH49683. Culvert placement needs to be aware of existing Telstra.

Section 3 Sheet 2 of 2 – add CH9470 LHS to the list for access works.

15 April 2021 Review

Design Notes 3, 4 & 9 appear to be satisfied through appropriate signage (similar to existing situation), appropriate superelevation and sufficient lengths of sag curves. Issue CLOSED.

Std Dwg 1807 covers the access construction. Issue CLOSED.

2. Horizontal

a. Section 3

9 November 2020 Review

Radius 400 CH7920 – CH8060 for the design speed of 100 km/h (truck) has a friction of 0.167. Superelevation crossfall is designed to 3%. The recommended max friction is 0.12. Indicate measures to improve safety. Signage and warning signs to be added.

Sheet 1 of 7 (Dwg C008) - BAR treatment (spelling mistake) to be corrected.

15 April 2021 Review

Appears to be satisfied through appropriate signage (similar to existing situation) and appropriate superelevation. Issue CLOSED.

3. Aquaplaning

9 November 2020 Review

Section 3 – Curve CH7920 - Indicate the aquaplaning flow path.

15 April 2021 Review

No details provided.

Released under RTI - DTMR

14 May 2021 Review

Calculations provided indicate aquaplaning shouldn't be a problem. Issue CLOSED.

4. Vertical

9 November 2020 Review

There are numerous instances of inadequate lengths of curves.

13 April 2021 Review

Note 9 uses Austroads Part 3 Figure 8.9. VC lengths acceptable. Issue CLOSED.

5. Cross Sections

9 November 2020 Review

Section 3 – Dwgs C046 – C054 - It is noted that table drains and flat bottom drains will be installed (Reference Dwg C008) – but there are many sections in the table drains where design levels would suggest it will hold water. The recommended solutions are to outflow these into private properties – indicate if agreements have been made with property owners for this to occur.

15 April 2021 Review

Table drains are graded as best as possible – many areas have extreme flat areas and most likely will hold water – similar to the current situation. Issue CLOSED.

6. Intersections

Refer Note 2 Below.

7. Drainage

9 November 2020 Review

Provide a culvert inspection report on the existing culverts. Refer Road Drainage Manual Chapter 9 (Clause 9.2.6.2) for replacing / widening existing culverts.

Culvert RHS CH8050 under side road – refer RDM Chapter 9 for widening / replacing culverts. Further info, design levels to be provided.

15 April 2021 Review

All existing culverts will be removed and replaced. Issue CLOSED.

8. Floodways

9 November 2020 Review

The long section flooding crossing at CH9745 – CH9840 is 70 mm – 90 mm lower than the existing. Demonstrate if this will flow out on the downstream side.

The long section flooding crossing at CH10708 – CH10767 is 90mm lower than the existing. Demonstrate if this will flow out on the downstream side.

15 April 2021 Review

Table drains have been graded to the culverts. Issue CLOSED.

9 November 2020 Review

Released under RTI - DTMR

CH10718– CH10733 - It is noted that floodway will be installed (Reference Dwg C012) – refer to DWG C120 for details. Please provide drawing for review.

15 April 2021 Review

Drawings provided. Issue CLOSED.

9. Chainages

9 November 2020 Review

Section 3 – Plan C008 – the Chainages on the plan from CH7780 – CH7920 are written incorrect. Several are repeated. Amend.

15 April 2021 Review

Amendments made. Issue CLOSED.

10. Private Access / vehicle swept paths

9 November 2020 Review

Demonstrate the vehicle types expected – vehicle swept paths required on accesses and intersections.

15 April 2021 Review

Swept paths added for semi-trailer. No swept paths for check vehicle. Issue CLOSED.

11. Services

a. Gas:

9 November 2020 Review

CH7780 LHS shows 2x gas mains but 1 of them just stops – demonstrate correct locations of existing gas lines

CH8000 LHS the design will be closer to the gas main – demonstrate any agreements / approvals from gas to construct near their main. Indicate if these mains have been plotted from DBYD or physically located.

15 April 2021 Review

It is still unclear as to the location of the 2nd gas main on the eastern side. Confirm that it stops before the works or indicate its location.

14 May 2021

Email response:

"The gas pipelines as shown are based off the feature survey and DBYD information which shows one line continuing and the second line terminating. Arrow Energy are currently reviewing their as-constructed information to confirm this configuration."

Positive confirmation of location/configuration required as this is HIGH RISK. Issue remains OPEN.

b. Telstra:

9 November 2020 Review

CH 8040 under the side road – demonstrate the available clearances or required protection works

15 April 2021 Review

The Telstra cable doesn't appear very deep. Issue CLOSED. (Construction RISK to manage.)

Released under RTI - DTMR

12. Signage / Linemarking

9 November 2020 Review

Provide drawings for any new sign locations & types.

15 April 2021 Review

It appears that linemarking is shown on all plans – although it's not very clear. Issue CLOSED. (Separate linemarking and signage plans preferred.)

COMMENTS FOR TMR PP&CM TEAM

1. Section 1 Ends CH3498. Section 3 Starts CH7768 and Ends CH11800. This design leaves out many sections of the existing road. Have we approved the use of road trains on the "missing links"?

2. Leahy's Road – Suggests "Future Intersection Upgrade" – has TMR agreed to this? Are we expecting future works around this intersection? There are gas mains in the area and developers need to be careful and aware of the dangers with this.

NR

A/Senior Designer (Civil)

14 May 2021

Released under RTI - DTMR

SURAT INFRASTRUCTURE DAANDINE NANDI ROAD CHAINAGE 0 - 3.65 KM & 7.9 - 11.8KM

PAVEMENT DESIGN REPORT

Arrow Document No: S00B01-ARW-CIV-REP-00034

HIG Job No. P10646

Released under PTSD TMR

Document control sheet

If you have any questions regarding this document, please contact:

Contact NR
Title Senior Civil Engineer (Harrison Infrastructure Group)
Phone NR
Job No. P10646

ARROW REV	HIG REV	ISSUE DATE	DESCRIPTION	PREPARED BY	AUTHORISATION	
					NAME / POSITION	SIGNATURE
0.1	1	26/02/2021	Issue for Client Review	NR	NR	NR
1.0	2	31/05/2021	Issue for Use			

This document is considered uncontrolled when printed.

REVISION HISTORY

This table describes the primary reason for the production of each new revision after Rev 1.0

DATE	REV	REASON FOR CHANGE

Released under RTI - DTMR

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1. Introduction

Harrison Infrastructure Group (HIG) has been engaged by Brandon and Associates to undertake a pavement design for the upgrade of two unsealed sections of Daandine - Nandi Road:

- Section 1: Ch 0.0 – 3.5 km
- Section 3: Ch 7.9 – 11.8 km

Brandon and Associates completed a previous *Pavement Design Report (Job No. 201238)* for this project which looked at a number of different pavement options. Transport and Main Roads (TMR) reviewed the report and advised that their preferred option is lime stabilised subgrade with unbound pavement. This pavement design report (by HIG) will document the preferred pavement configuration.

2. Design Traffic

As detailed in Brandon and Associates' *Pavement Design Report (Job No. 201238)* the design traffic is made up of background traffic and development traffic. The traffic parameters detailed in Brandon and Associates' *Pavement Design Report (Job No. 201238)* have generally been adopted, except the N_{HVAG} and ESAs/HVAG for the development traffic. For consistency, the N_{HVAG} and ESAs/HVAG calculated for the background traffic have also been adopted for the development traffic.

No WIM data was available for Daandine – Nandi Road, and the nearest available WIM site (Warrego Highway at Oakey) was not considered relevant to this road. As per Method 3 in Appendix E of the *Pavement Design Supplement*, the Traffic Load Distributions (TLDs) have been estimated based on presumptive class-specific TLDs combined with the classified vehicle count provided for Daandine – Nandi Road. As shown below, N_{HVAG} = 2.92 and ESAs/HVAG = 0.85 have been calculated.

Released under RTI to DTMR

Class-Specific Traffic Load Distributions Spreadsheet (Transport and Main Roads, July 2018)

This is the calculation worksheet. Follow Steps 1 to 4 below to fill in the yellow cells. The resulting traffic load distribution can then be exported for use in pavement design.

STEP 1: Insert project details

Project site details	Project Name	Daandine - Nandi Road Upgrade
	Road Section(s)	Ch 0.0 - 3.5 and Ch 7.9 - 11.8
	Project Info	Road upgrade to bitumen sealed standard

STEP 2: Insert classified traffic count details

Classified Traffic Count site details	Road ID/Name	Daandine - Nandi Road	Chainage	11.91
	Site ID	34142	Traffic Lane	1
	Site Location	300 m west of Greenbank Rd	Data Year	2019
Classification Type: Select either 12 bin or 4 bin classification inputs from the drop-down list (12 bin preferred) (click cell				12 bin

Classified Traffic Counts or Proportions: Based on your selection above, enter either 12 bin or 4 bin inputs below. Enter as either counts or proportions (% or decimal).

	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12
Counts/proportions (12 bin)	4.0	1.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0
Counts/proportions (4 bin)										
Heavy Vehicle Proportions	44.44%	11.11%	0.00%	0.00%	0.00%	0.00%	22.22%	0.00%	22.22%	0.00%

STEP 3: Select a WIM site from the drop-down menu (click cell A24)

District - Road ID - Lane - WIM Site Description	Road Name	Chainage	WIM Site ID & Lane
Presumptive CTLD (2013-2016)	Presumptive Class-specific Traffic Load Distributions (Year 2013 - 2016)	N/A	Presumptive CTLD

		Weigh-in-Motion data based on selected WIM site details									
	Recombined	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12
NHVAG	2.92	2.00	2.00	2.00	3.00	3.05	3.08	3.03	4.00	5.09	7.16
ESA / HVAG	0.85	0.45	1.07	1.24	0.26	0.70	0.79	1.04	1.19	1.00	0.97
ESA / HV	2.47	0.89	2.14	2.48	0.78	2.12	2.43	3.14	4.74	5.10	6.94
WIM recorded heavy vehicles		7,384,777	3,822,453	1,003,523	548,895	1,061,474	1,318,644	9,368,146	5,445,828	628,245	58,571

Figure 1 - Class Specific Traffic Load Distributions

The following is a summary of the design traffic calculations for Section 1.

PROJECT NO	P10646 - Daandine Nandi Rd - Section 1						
DESIGN TRAFFIC							
	Reference Austroads 2017 TMR Supplement Austroads Part 2 - Pavement 2017						
		Unit	Background	Development 2021 - 2024	Development 2025 - 2031	Development 2032 - 2040	Total
HV Growth Rate	Heavy Vehicle Growth Rate per Annum (assumed)	%	2.00%	0.00%	0.00%	0.00%	
AADT	Average Annual Daily Traffic (southbound)	vpd	36	26	18	20	
HV%	% of Heavy Vehicle	%	25.0%	57.0%	57.0%	25.0%	
DF	Direction Factor	N/A	1.0	1.0	1.0	1.0	
N_H	Number of heavy vehicles per day each direction	vpd	9	15	10	5	
Future Loading							
N_{DT} =	N_H * g * LDF * CGF * 365 * N_{HVAG}						
N_{HVAG}	Average No of axle Groups per Heavy Vehicles Use WIM DATA or presumptive	N/A	2.92	2.92	2.92	2.92	
Y	Road Opening Year	Year	2021	2021	2021	2021	
x	Time - count year to Road Opening Year	years	2	0	0	0	
r	Heavy Vehicle Growth Rate per Annum (assumed)	%	2.00%	0.00%	0.00%	0.00%	
g	Growth Factor from count year to Design Year (Equation 7.4.4(a), PDS)	N/A	1.04	1.00	1.00	1.00	
P	Design Period	years	20.00	4.00	7.00	9.00	
R	Annual Growth Rate (assumed)	%	2.00%	0.00%	0.00%	0.00%	
LDF	Lane Distribution Factor	N/A	1.0	1.0	1.0	1.0	
CGF	Cumulative Growth Factor (Equation 31, Austroads 2017)	N/A	24.30	4.00	7.00	9.00	
N_{DT}	Design Traffic	Cumulative HVAG	2.42E+05	6.39E+04	7.46E+04	4.80E+04	**4.29E+05**
Design Equivalent Standard Axles (D_{ESA})							
DESA =	N_{DT} x (ESA/HVAG)						
ESA/HVAG	Damage Index Value Use WIM DATA or presumptive	N/A	0.85	0.85	0.85	0.85	
DESA	Design Equivalent Standard axles	ESA	2.06E+05	5.44E+04	6.34E+04	4.08E+04	**3.65E+05**
N_{1st}/day	First Year ESA	ESA/day	23	37	25	12	

Figure 2 - Traffic Data for Section 1

Released under the DNR

As shown above, the DESA for Section 1 is 3.65 x 10^5.

The following is a summary of the design traffic calculations for Section 3.

PROJECT NO	P10646 - Daandine Nandi Rd - Section 3						
DESIGN TRAFFIC							
	Reference						
	Austroads 2017						
	TMR Supplement Austroads Part 2 - Pavement 2017						
		Unit	Background	Development 2021 - 2024	Development 2025 - 2031	Development 2032 - 2040	Total
HV Growth Rate	Heavy Vehicle Growth Rate per Annum (assumed)	%	2.00%	0.00%	0.00%	0.00%	
AADT	Average Annual Daily Traffic (southbound)	vpd	36	103	70	20	
HV%	% of Heavy Vehicle	%	25.0%	57.0%	57.0%	25.0%	
DF	Direction Factor	N/A	1.0	1.0	1.0	1.0	
N_H	Number of heavy vehicles per day each direction	vpd	9	59	40	5	
Future Loading							
N_{DT} =	N_H * g * LDF * CGF * 365 * N_{HVAG}						
N_{HVAG}	Average No of axle Groups per Heavy Vehicles Use WIM DATA or presumptive	N/A	2.92	2.92	2.92	2.92	
Y	Road Opening Year	Year	2021	2021	2021	2021	
x	Time - count year to Road Opening Year	years	2	0	0	0	
r	Heavy Vehicle Growth Rate per Annum (assumed)	%	2.00%	0.00%	0.00%	0.00%	
g	Growth Factor from count year to Design Year (Equation 7.4.4(a), PDS)	N/A	1.04	1.00	1.00	1.00	
P	Design Period	years	20.00	4.00	7.00	9.00	
R	Annual Growth Rate (assumed)	%	2.00%	0.00%	0.00%	0.00%	
LDF	Lane Distribution Factor	N/A	1.0	1.0	1.0	1.0	
CGF	Cumulative Growth Factor (Equation 31, Austroads 2017)	N/A	24.30	4.00	7.00	9.00	
N_{DT}	Design Traffic	Cumulative HVAG	2.42E+05	2.52E+05	2.98E+05	4.80E+04	**8.40E+05**
Design Equivalent Standard Axles (D_{ESA})							
DESA =	N_{DT} x (ESA/HVAG)						
ESA/HVAG	Damage Index Value Use WIM DATA or presumptive	N/A	0.85	0.85	0.85	0.85	
DESA	Design Equivalent Standard axles	ESA	2.06E+05	2.14E+05	2.54E+05	4.08E+04	**7.14E+05**
N_{1st}/day	First Year ESA	ESA/day	23	146	99	12	

Figure 3 - Traffic Data for Section 3

As shown above, the DESA for Section 3 is 7.14 x 10^5.

Released under RTI to TMR

3. Subgrade Evaluation

The table below shows a summary of the laboratory testing undertaken as part of the geotechnical investigation completed by CTQS. Material testing reports have been included in Appendix A.

Section	Borehole No.	Sample Depth (m)	FMC (%)	LL (%)	PI (%)	LS (%)	4 Day Soaked CBR (%) (at X% MDD & OMC)	Swell (%)	Description	Sample Material Classification
1	60	0.3-0.6	14.5	50	31	15	2 (100% MDD)	5.0	Silty Clay	CH
	59	0.3-0.6	13.5	49	32	16	2.5 (100% MDD)	3.7	Silty Clay	CI
	58	0.3-0.6	15.1	47	33	17	2 (100% MDD)	5.3	Silty Clay	CI
	57	0.3-0.6	12.1	47	30	15	2 (100% MDD)	6.2	Silty Clay	CI
	56	0.3-0.6	13.4	58	35	17.5	1.5 (100% MDD)	4.9	Silty Clay	CH
	55	0.3-0.6	17.9	52	31	15	2.5 (100% MDD)	4.9	Silty Clay	CH
	54	0.3-0.6	15.6	57	31	14.5	3 (100% MDD)	3.4	Silty Clay	CI
	101	0.5-1.0	16.0	52	32	16	2 (95% MDD)	4.5	Silty Clay	CH
	102	0.5-1.0	11.8	51	31	15.5	2.5 (95% MDD)	3.0	Silty Clay	CH
	103	0.5-1.0	13.7	52	33	17	3 (95% MDD)	3.0	Silty Clay	CH
	104	0.5-1.0	14.3	51	31	16	2.5 (95% MDD)	4.0	Silty Clay	CH
3	67	0.3-0.6	14.8	47	32	16.5	2.5 (100% MDD)	4.0	Silty Clay	CI
	66	0.3-0.6	20.5	46	29	15	2.5 (100% MDD)	3.5	Silty Clay	CI
	65	0.3-0.6	15.8	50	32	16	1.5 (100% MDD)	7.0	Silty Clay	CH
	64	0.3-0.6	18.3	50	35	17	2 (100% MDD)	6.0	Silty Clay	CH
	63	0.3-0.6	13.4	50	31	15	2 (100% MDD)	7.0	Silty Clay	CH

Released under RTI - DTMR

Section	Borehole No.	Sample Depth (m)	FMC (%)	LL (%)	PI (%)	LS (%)	4 Day Soaked CBR (%) (at X% MDD & OMC)	Swell (%)	Description	Sample Material Classification
	62	0.3-0.6	13.6	45	30	15	2 (100% MDD)	8.0	Silty Clay	CI
	61	0.3-0.6	14.5	49	31	16	2 (100% MDD)	6.0	Silty Clay	CI
	105	0.5-1.0	13.7	51	33	16.5	1.5 (95% MDD)	6.0	Silty Clay	CH
	106	0.5-1.0	17.1	51	33	17	2.5 (95% MDD)	3.5	Silty Clay	CH
	107	0.5-1.0	17.1	54	34	17	2.5 (95% MDD)	4.5	Silty Clay	CH
	108	0.5-1.0	18.5	56	37	19	2 (95% MDD)	4.0	Silty Clay	CH
	109	0.5-1.0	17.1	58	38	19	2.5 (95% MDD)	5.5	Silty Clay	CH

Table 1 - Laboratory Test Results

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Based on the test results in Table 1, the lower 10th percentile values have been calculated for the soaked CBRs of each section. These will be used for the design subgrade CBRs. The upper 10th percentile swell results from Table 1 have also been classified for each section as per Table 5.3.5 of the *Pavement Design Supplement*. The following design subgrade CBRs and expansive nature classifications have been adopted for each section.

Section	Design Subgrade CBR	Expansive Nature of Subgrade
1	1.5	Very High
3	1.5	Very High

Table 2 – Design Subgrade CBR and Expansive Nature Classification

As per Clause 5.3.5 of the *Pavement Design Supplement*, Daandine - Nandi Road is in Climatic Zone 4 (dry temperate), and the depth of design soil suction is considered to be very high. In these areas, providing a minimum cover of material over very highly expansive soil is not typically economic as substantial thicknesses of cover are required. In these areas, other treatments are typically adopted and these are selected and designed in accordance with local practice (for example, lime stabilisation).

The silty clay has been tested for suitability of lime stabilisation. The table below shows a summary of the lime demand and unconfined compressive strength (UCS) testing undertaken as part of the geotechnical investigation completed by CTQS. Material testing reports have been included in Appendix A.

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Bore Hole Number	BH-101	BH-102	BH-103	BH-104	BH-105	BH-106	BH-107	BH-108	BH-109
Lime Demand %	4	3.5	3.5	3	5	3	3	3.5	3
UCS 0% (MPa)	0.4	0.4	0.5	0.5	0.6	0.4	0.5	0.4	0.4
USC LD-2 (MPa)	0.8	1.1	0.7	0.5	1.5	0.6	0.5	0.5	0.5
UCS LD (MPa)	1.9	1.7	1	1.2	1.2	1.6	1.1	0.8	1.1
UCS LD+2 (MPa)	1.7	1.9	1.9	1.2	2.4	2	1.8	1.1	1.3
UCS LD+4 (MPa)	2	1.8	1.6	1.9	1.4	2.2	1.2	1.1	1.2
MDD 0% (t/m^3)	1.74	1.81	1.78	1.75	1.7	1.71	1.68	1.64	1.74
MDD LD-2 (t/m^3)	1.73	1.75	1.72	1.72	1.62	1.69	1.64	1.61	1.72
MDD LD (t/m^3)	1.69	1.72	1.7	1.68	1.59	1.63	1.61	1.57	1.69
MDD LD+2 (t/m^3)	1.66	1.7	1.68	1.66	1.57	1.61	1.58	1.57	1.68
MDD LD+4 (t/m^3)	1.66	1.69	1.66	1.63	1.57	1.57	1.59	1.56	1.66
OMC 0% (%)	18.9	16.4	17.8	17.9	19.5	19.3	19.9	20.1	17.6
OMC LD-2 (%)	18.1	16.3	17.9	18.6	21.5	18	20.4	21.5	17.7
OMC LD (%)	18.5	17	17.5	19.1	19.1	19.5	20.3	21.1	18.6
OMC LD+2 (%)	18.2	17.1	19.3	18.5	22	20	22.3	20.5	17.4
OMC LD+4 (%)	18.8	17	18.5	19.6	19.5	20.6	19.6	20.2	17.2

Table 3 - Test Results for Lime Demand and Unconfined Compressive Strength Tests

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As per Clause 6 of *Structural design procedure of pavements on lime stabilised subgrades* the dosage rates of lime for construction will be the greatest of the lime demand test results and the lime required to achieve the target UCS of 1.5 MPa at 28 days. The range of UCSs should be between 1.0–2.0 MPa with a target UCS of 1.5 MPa (28 days) to make the lime stabilisation successful. The figure below shows the UCS versus lime content test results. The available lime index for the stabilising agent (hydrated lime) used in the laboratory testing was 93.1%.

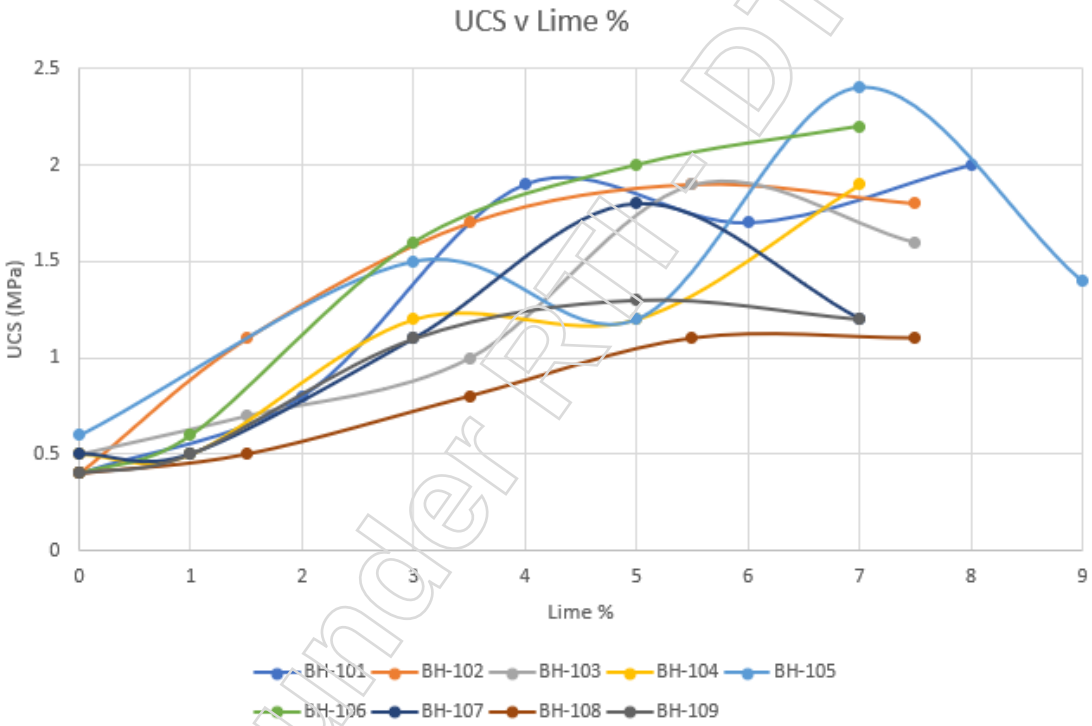


Figure 4 - UCS v Lime Content Test Results

Based on the test results shown above, the optimum design lime content is 5%. As requested by TMR, 1% will be added to the optimum design lime content to allow for construction tolerances. Therefore, the target stabilising agent (hydrated lime) content will be 6%. Based on 300 mm lime stabilisation depth and an average density of 1.65 t/m^3, the proposed spread rate is 30 kg/m^2. This spread rate should be adjusted during construction if the available lime index for the hydrated lime used in construction differs to that of the hydrated lime used in the laboratory mix design testing (93.1%).

4. Pavement Design

The design was undertaken in accordance with TMR's *Structural design procedure of pavements on lime stabilised subgrades*. The thickness of the lime stabilised layer was set at the desirable thickness of 300 mm. Refer to Appendix B for Circly analysis.

The calculated unbound pavement depths (including 20 mm construction tolerance) combined with lime stabilised subgrade are shown below.

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Section	Design Subgrade CBR	Unbound Pavement Depth (mm)
1	1.5	310
3	1.5	340

Table 4 – Unbound Pavement Depth Required Over 300 mm Lime Stabilisation

The lime stabilised subgrade should limit the moisture changes in the underlying reactive material, and therefore limit the shrink/swell impacts on the pavement. As recommended by TMR, a geosynthetic is proposed between the lime stabilised subgrade and granular subbase to reduce the risk of cracks developing in the pavement.

The median rainfall of the site is between 500 and 800 mm/year. As per Section 2, the average daily traffic in the design lane in the year of opening are 60 ESAs/day (Section 1) and 169 ESAs/day (Section 3). Considering material availability in the area and Table 6.2.1 of the *Pavement Design Supplement*, the following unbound pavement materials are proposed:

- Base: Type 3.1
- Subbase: Type 3.3

It is expected this road will be constructed under traffic, so an initial seal is proposed in lieu of a prime. Considering the high temperatures at the site and the high proportion of heavy vehicles expected, a HSS1 seal is proposed.

5. Conclusions

The recommended pavement configuration for Section 1 is summarised as follows:

Layer	Material	Depth (mm)
Seal (HSS1)	14 mm S45R (estimated spray rate 2.1 L/m^2, estimated spread rate 85 m^2/m^3)	9
Initial Seal	10 mm AMC5 (estimated spray rate 1.4 L/m^2, estimated spread rate 120 m^2/m^3)	6
Base	Type 3.1	150
Subbase	Type 3.3	160
Pavement Geosynthetic	Type 1 Geocomposite	N/A
Subgrade Treatment	Lime Stabilisation	300

Table 5 - Pavement Configuration for Section 1

The recommended pavement configuration for Section 3 is summarised as follows:

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Layer	Material	Depth (mm)
Seal (HSS1)	14 mm S45R (estimated spray rate 2.0 L/m^2, estimated spread rate 85 m^2/m^3)	9
Initial Seal	10 mm AMC5 (estimated spray rate 1.4 L/m^2, estimated spread rate 120 m^2/m^3)	6
Base	Type 3.1	150
Subbase	Type 3.3	190
Pavement Geosynthetic	Type 1 Geocomposite	N/A
Subgrade Treatment	Lime Stabilisation	300

Table 6 - Pavement Configuration for Section 3

As discussed in Section 3, the target stabilising agent (hydrated lime) content for the subgrade stabilisation is 6%, and the proposed spread rate is 30 kg/m^2. This spread rate should be adjusted during construction if the available lime index for the hydrated lime used in construction differs to that of the hydrated lime used in the laboratory mix design testing (93.1%).

6. References

Austroads Guide to Pavement Design Technology, Part 2: Pavement Structural Design, 2017

Materials Testing Manual, Edition 5, Amendment 5, TMR, March 2021

Pavement Design Supplement - Supplement to 'Part 2: Pavement Structural Design' of the Austroads Guide to Pavement Technology, TMR, 2018

Structural design procedure of pavements on lime stabilised subgrades, TMR, September 2020

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Appendix A – Soil Test Results

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WS27 Borelog Report

Borehole Number: **BH-60**	Easting: **0305918**	Northing: **6997630**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 1**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **01/07/2020** **MATERIAL DESCRIPTION**	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150 200	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CH		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-59**	Easting: **0305617**	Northing: **6998068**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 1**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **01/07/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CI		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-58**	Easting: **0305295**	Northing: **6998491**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 1**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **01/07/2020** **MATERIAL DESCRIPTION**	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150 200	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CI		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-57**	Easting: **0304992**	Northing: **6998921**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 1**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **01/07/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150 200	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CI		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-56**	Easting: **0304674**	Northing: **6999342**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 1**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **01/07/2020** **MATERIAL DESCRIPTION**	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CH		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-55**	Easting: **0304564**	Northing: **6999839**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 1**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **01/07/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CH		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-54**	Easting: **0304630**	Northing: **7000386**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 1**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **01/07/2020** **MATERIAL DESCRIPTION**	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150 200	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CI		Dark Grey	Moist	Very Stiff		D		

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Construction Testing and Quality Services Dalby
14 Sandalwood Avenue West, Dalby, QLD 4405
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E: admin@ctqs.com.au

California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 6/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**8/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		

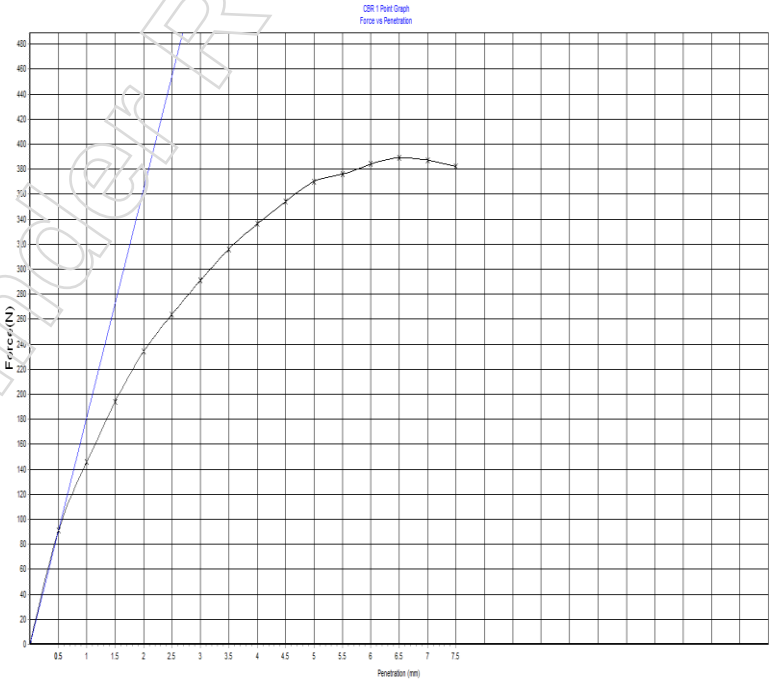
Sample Number :	D20-495
Date Sampled :	1/07/2020
Date Tested :	2/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-60 - E:0305918 N:6997630
Subgrade
TRN - 0227

Lot Number :	BH-60
Test Number :	1
	#REF!

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.65
Optimum Moisture Content (%) :	17.0
Compactive Effort :	Standard
Nominated Percentage of MDD :	100.0
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100.6
Achieved Percentage of OMC :	98
Dry Density Before Soak (t/m³) :	1.66
Dry Density After Soak (t/m³) :	1.58
Moisture Content Before Soak (%) :	16.7
Moisture Content After Soak (%) :	22.7
Density Ratio After Soak (%) :	96.0
Field Moisture Content (%) :	14.5
Top Moisture Content - After Penetration (%) :	25.9
Total Moisture Content - After Penetration (%) :	22.8
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	5.0



CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	2
Oversize (%) :		CBR 5.0mm (%) :	**2**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2**
Soil Description :			
Site Selection :	Random		
Plasticity Method :	Visual/Tactile		
Curing Time :	48		

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Document Code RFA40-11

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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 6/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**8/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		

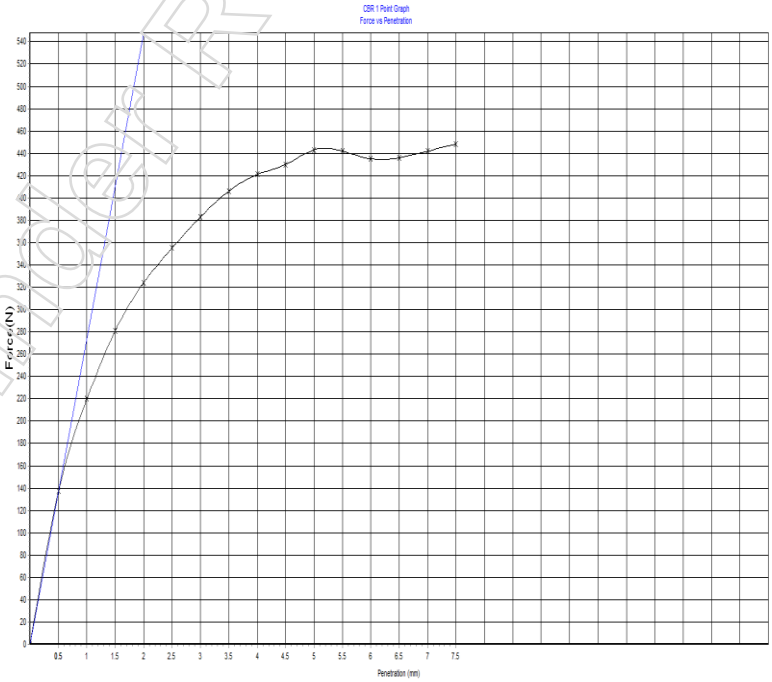
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Date Sampled :	1/07/2020
Date Tested :	3/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-59 - E:0305617 N:6998068
Subgrade
TRN - 0227

Lot Number :	BH-59
Test Number :	1

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.69
Optimum Moisture Content (%) :	17.0
Compactive Effort :	Standard
Nominated Percentage of MDD :	100.0
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	99.4
Achieved Percentage of OMC :	98
Dry Density Before Soak (t/m³) :	1.68
Dry Density After Soak (t/m³) :	1.62
Moisture Content Before Soak (%) :	16.7
Moisture Content After Soak (%) :	23.2
Density Ratio After Soak (%) :	96.0
Field Moisture Content (%) :	13.5
Top Moisture Content - After Penetration (%) :	26.5
Total Moisture Content - After Penetration (%) :	23.6
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	3.7



CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	2.5
Oversize (%) :		CBR 5.0mm (%) :	**2**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2.5**
Soil Description :			
Site Selection :	Random		
Plasticity Method :	Visual/Tactile		
Curing Time :	48		

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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 6/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**8/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		

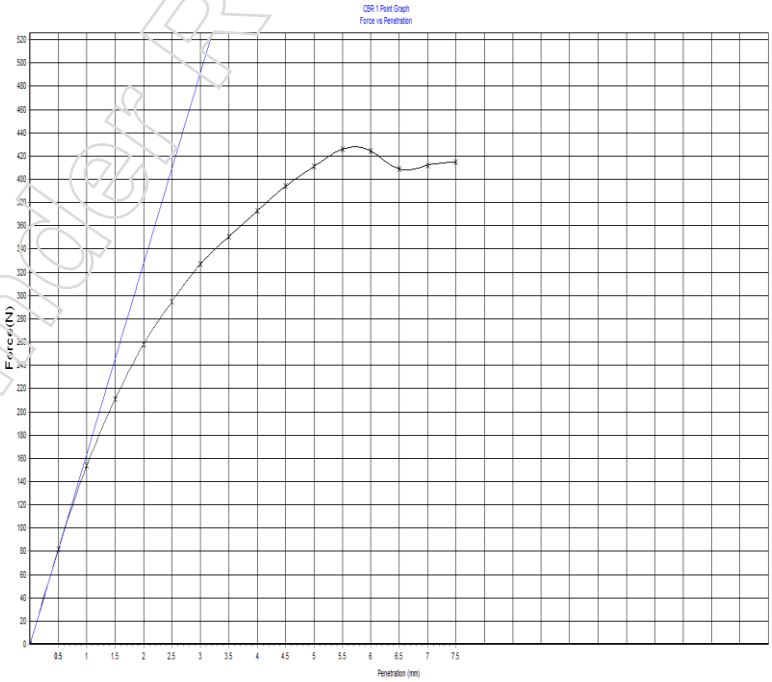
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Date Tested :	3/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-58 - E:0305295 N:6998491
Subgrade
TRN - 0227

Lot Number :	BH-58
Test Number :	1
	#REF!

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.67
Optimum Moisture Content (%) :	17.0
Compactive Effort :	Standard
Nominated Percentage of MDD :	100.0
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	99.4
Achieved Percentage of OMC :	100
Dry Density Before Soak (t/m³) :	1.66
Dry Density After Soak (t/m³) :	1.58
Moisture Content Before Soak (%) :	17.0
Moisture Content After Soak (%) :	23.6
Density Ratio After Soak (%) :	95.0
Field Moisture Content (%) :	15.1
Top Moisture Content - After Penetration (%) :	26.5
Total Moisture Content - After Penetration (%) :	23.6
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	5.3



CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	2
Oversize (%) :		CBR 5.0mm (%) :	**2**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2**
Soil Description :			
Site Selection :	Random		
Plasticity Method :	Visual/Tactile		
Curing Time :	48		

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NR Manager of Technical Services

NATA Accreditation Number :

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Construction Testing and Quality Services Dalby
14 Sandalwood Avenue West, Dalby, QLD 4405
M: NR
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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 6/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**8/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		

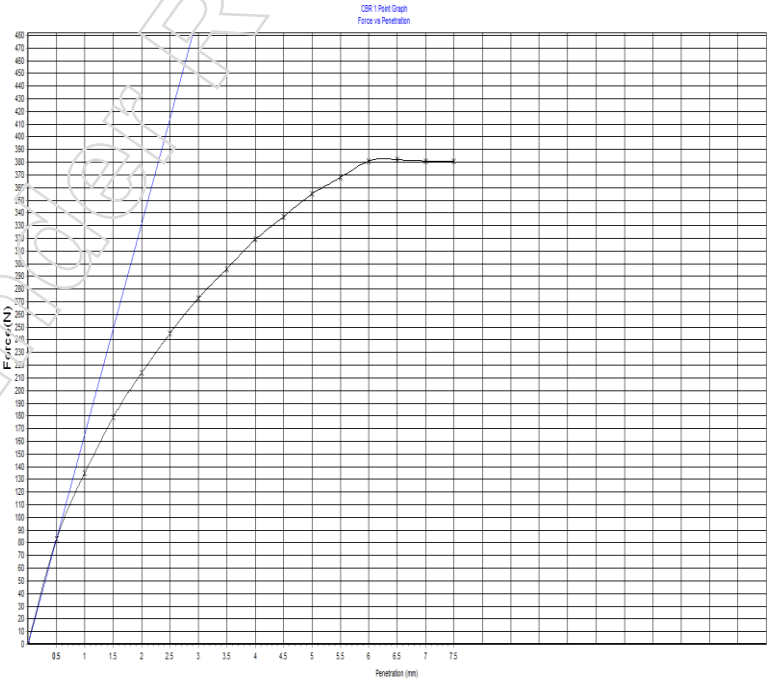
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Date Sampled :	1/07/2020
Date Tested :	3/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-57 - E:0304992 N:6998921
Subgrade
TRN - 0227

Lot Number :	BH-57
Test Number :	1
	#REF!

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.73
Optimum Moisture Content (%) :	14.5
Compactive Effort :	Standard
Nominated Percentage of MDD :	100.0
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	98.8
Achieved Percentage of OMC :	100
Dry Density Before Soak (t/m³) :	1.71
Dry Density After Soak (t/m³) :	1.61
Moisture Content Before Soak (%) :	14.5
Moisture Content After Soak (%) :	21.8
Density Ratio After Soak (%) :	93.0
Field Moisture Content (%) :	12.1
Top Moisture Content - After Penetration (%) :	20.5
Total Moisture Content - After Penetration (%) :	21.2
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	6.2



CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	2
Oversize (%) :		CBR 5.0mm (%) :	**2**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2**
Soil Description :			
Site Selection :	Random		
Plasticity Method :	Visual/Tactile		
Curing Time :	48		

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NATA
WORLD RECOGNISED ACCREDITATION

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APPROVED SIGNATORY
NR
NR - Manager of Technical Services
NATA Accreditation Number :
NR

Construction Testing and Quality Services Dalby
14 Sandalwood Avenue West, Dalby, QLD 4405
M: NR
E: admin@ctqs.com.au

California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 6/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**8/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**	**Page 5 of 7**	

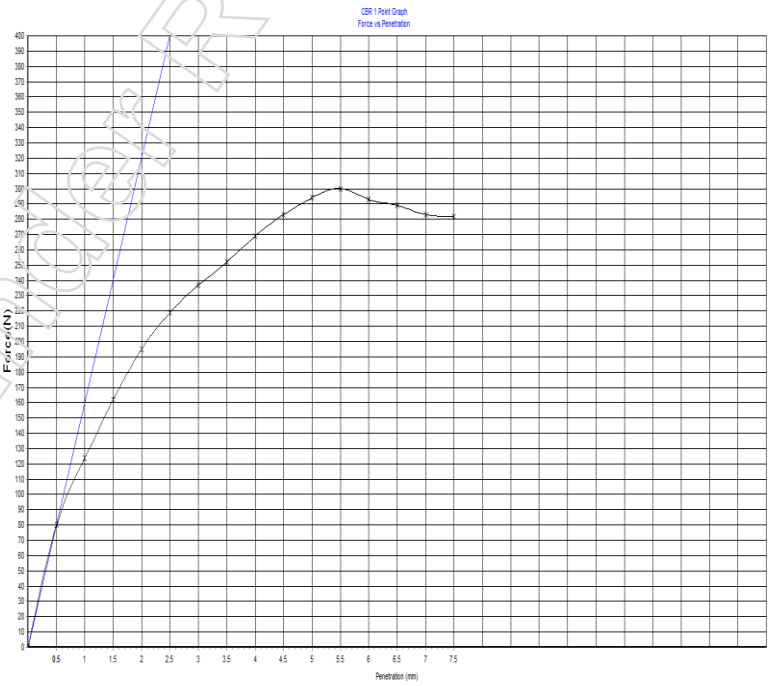
Sample Number :	D20-499
Date Sampled :	1/07/2020
Date Tested :	3/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-56 - E:0304674 N:6999342
Subgrade
TRN - 0227

Lot Number :	BH-56
Test Number :	1
	#REF!

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.74
Optimum Moisture Content (%) :	16.5
Compactive Effort :	Standard
Nominated Percentage of MDD :	100.0
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100.0
Achieved Percentage of OMC :	99
Dry Density Before Soak (t/m³) :	1.74
Dry Density After Soak (t/m³) :	1.65
Moisture Content Before Soak (%) :	16.4
Moisture Content After Soak (%) :	20.1
Density Ratio After Soak (%) :	95.0
Field Moisture Content (%) :	13.4
Top Moisture Content - After Penetration (%) :	23.3
Total Moisture Content - After Penetration (%) :	20.2
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	4.9



CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	1.5
Oversize (%) :		CBR 5.0mm (%) :	**1.5**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**1.5**
Soil Description :			
Site Selection :	Random		
Plasticity Method :	Visual/Tactile		
Curing Time :	48		

NATA WORLD RECOGNISED ACCREDITATION

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NATA Accreditation Number :
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Document Code RFA40-11

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Construction Testing and Quality Services Dalby
14 Sandalwood Avenue West, Dalby, QLD 4405
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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 6/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**8/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		**Page 6 of 7**

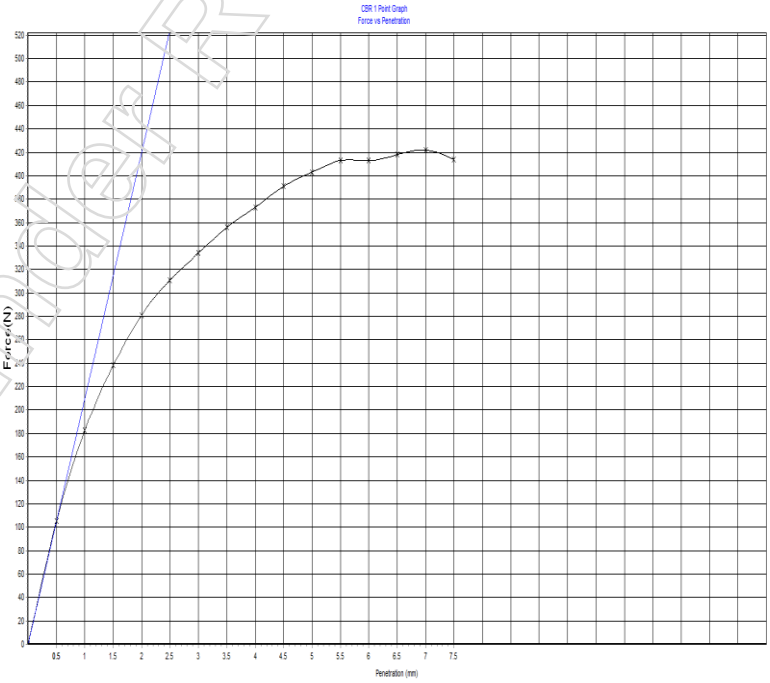
Sample Number :	D20-500
Date Sampled :	1/07/2020
Date Tested :	3/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-55 - E:0304564 N:6999839
Subgrade
TRN - 0227

Lot Number :	BH-55
Test Number :	1
	#REF!

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.66
Optimum Moisture Content (%) :	16.5
Compactive Effort :	Standard
Nominated Percentage of MDD :	100.0
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	98.8
Achieved Percentage of OMC :	101
Dry Density Before Soak (t/m³) :	1.64
Dry Density After Soak (t/m³) :	1.57
Moisture Content Before Soak (%) :	16.7
Moisture Content After Soak (%) :	21.6
Density Ratio After Soak (%) :	95.0
Field Moisture Content (%) :	17.9
Top Moisture Content - After Penetration (%) :	24.7
Total Moisture Content - After Penetration (%) :	21.2
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	4.9



CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	2.5
Oversize (%) :		CBR 5.0mm (%) :	**2**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2.5**
Soil Description :			
Site Selection :	Random		
Plasticity Method :	Visual/Tactile		
Curing Time :	48		

NATA WORLD RECOGNISED ACCREDITATION

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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 6/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**8/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**	**Page 7 of 7**	

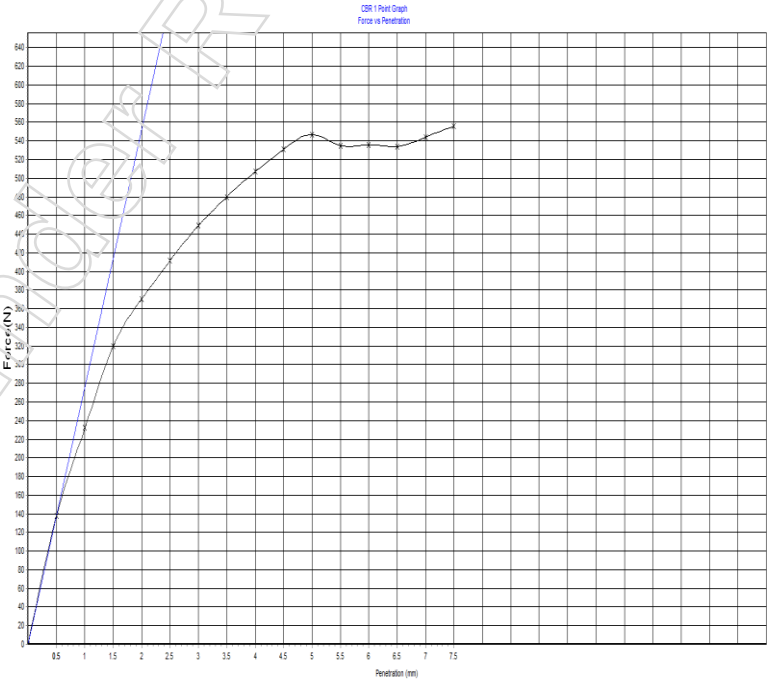
Sample Number :	D20-501
Date Sampled :	1/07/2020
Date Tested :	3/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-54 - E:0304630 N:7000386
Subgrade
TRN - 0227

Lot Number :	BH-54
Test Number :	1
	#REF!

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.69
Optimum Moisture Content (%) :	18.0
Compactive Effort :	Standard
Nominated Percentage of MDD :	100.0
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	99.4
Achieved Percentage of OMC :	100
Dry Density Before Soak (t/m³) :	1.68
Dry Density After Soak (t/m³) :	1.62
Moisture Content Before Soak (%) :	18.0
Moisture Content After Soak (%) :	22.0
Density Ratio After Soak (%) :	96.0
Field Moisture Content (%) :	15.6
Top Moisture Content - After Penetration (%) :	24.5
Total Moisture Content - After Penetration (%) :	21.9
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	3.4



CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	3
Oversize (%) :		CBR 5.0mm (%) :	**3**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**3**
Soil Description :			
Site Selection :	Random		
Plasticity Method :	Visual/Tactile		
Curing Time :	48		

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Atterberg Limits Report

Client :	**M J Smith Group**	Report Number:	**39 - 2/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Name :	**Pavement Investigation**	Order Number :	
Project Number :	**39**	Test Method :	**AS1289.3.9.2, 3.2.1, 3.3.1, 3.3.2 & 3.4.1**
Location:	**Daandine Nandi Road , Dalby**	**Page 1 of 2**	

Sample Number :	D20-495	D20-496	D20-497	D20-498
Test Number :	1	1	1	1
Date Sampled :	1/07/2020	1/07/2020	1/07/2020	1/07/2020
Date Tested :	3/07/2020	3/07/2020	3/07/2020	3/07/2020
Sampled By :	NR			
Sampling Method :	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material	Insitu Material	Insitu Material	Insitu Material
Material Type :	Subgrade	Subgrade	Subgrade	Subgrade
Sample Location :	**Daandine Nandi Road** **BH-60 - E:0305918 N:6997630** **Subgrade** **TRN - 0227**	**Daandine Nandi Road** **BH-59 - E:0305617 N:6998068** **Subgrade** **TRN - 0227**	**Daandine Nandi Road** **BH-58 - E:0305295 N:6998491** **Subgrade** **TRN - 0227**	**Daandine Nandi Road** **BH-57 - E:0304992 N:6998921** **Subgrade** **TRN - 0227**
Lot Number :	BH-60	BH-59	BH-58	BH-57
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Sample History :	Oven Dried	Oven Dried	Oven Dried	Oven Dried
Sample Preparation :	Wet	Wet	Wet	Wet
Notes :	Cracking & Curling Occured	Cracking & Curling Occured	Cracking & Curling Occured	Cracking & Curling Occured
Mould Length (mm) :	250	250	250	250
Liquid Limit (%) :	50	49	47	47
Plastic Limit (%) :	19	17	14	17
Plasticity Index (%) :	31	32	33	30
Linear Shrinkage (%) :	15	16	17	15
SPECIFICATION DETAILS				
Specification Number :				
Liquid Limit - Max :				
Plasticity Index - Max :				
Linear Shrinkage - Max :				
Remarks :	-			

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Atterberg Limits Report

Client :	**M J Smith Group**	Report Number:	**39 - 2/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Name :	**Pavement Investigation**	Order Number :	
Project Number :	**39**	Test Method :	**AS1289.3.9.2, 3.2.1, 3.3.1, 3.3.2 & 3.4.1**
Location:	**Daandine Nandi Road , Dalby**	**Page 2 of 2**	

Sample Number :	D20-499	D20-500	D20-501
Test Number :	1	1	1
Date Sampled :	1/07/2020	1/07/2020	1/07/2020
Date Tested :	3/07/2020	3/07/2020	3/07/2020
Sampled By :	NR		
Sampling Method :	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material	Insitu Material	Insitu Material
Material Type :	Subgrade	Subgrade	Subgrade
Sample Location :	**Daandine Nandi Road** **BH-56 - E:0304674 N:6999342** **Subgrade** **TRN - 0227**	**Daandine Nandi Road** **BH-55 - E:0304564 N:6999839** **Subgrade** **TRN - 0227**	**Daandine Nandi Road** **BH-54 - E:0304630 N:7000386** **Subgrade** **TRN - 0227**
Lot Number :	BH-56	BH-55	BH-54
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Sample History :	Oven Dried	Oven Dried	Oven Dried
Sample Preparation :	Wet	Wet	Wet
Notes :	Cracking & Curling Occured	Cracking & Curling Occured	Cracking & Curling Occured
Mould Length (mm) :	250	250	250
Liquid Limit (%) :	58	52	57
Plastic Limit (%) :	23	21	26
Plasticity Index (%) :	35	31	31
Linear Shrinkage (%) :	17.5	15	14.5
SPECIFICATION DETAILS			
Specification Number :			
Liquid Limit - Max :			
Plasticity Index - Max :			
Linear Shrinkage - Max :			
Remarks :	-		

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NATA WORLD RECOGNISED ACCREDITATION

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NATA Accreditation Number : NR

WS27 Borelog Report

Borehole Number: **BH-67**	Easting: **0311773**	Northing: **6991968**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 3**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **30/06/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CI		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-66**	Easting: **0311383**	Northing: **6992312**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 3**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **30/06/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CI		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-65**	Easting: **0310963**	Northing: **6992587**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 3**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **30/06/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CH		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-64**	Easting: **0310518**	Northing: **6992831**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 3**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **30/06/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150 200	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CH		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-63**	Easting: **0310084**	Northing: **6993084**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 3**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **30/06/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CH		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-62**	Easting: **0309639**	Northing: **6993327**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 3**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **30/06/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CI		Dark Grey	Moist	Very Stiff		D		

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WS27 Borelog Report

Borehole Number: **BH-61**	Easting: **0309201**	Northing: **6993582**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **350mm**
Location: **Section 3**	Project: **Daandine Nandi Road**	Method: **Auger**

Depth (mm)	Logged By: **FD** Date: **30/06/2020** MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
0 50 100 150	Sand/Clay GRAVEL		GC		Light Brown/White	Dry	Stiff				
200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000	Silty CLAY		CI		Dark Grey	Moist	Very Stiff		D		

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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 5/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		**Page 1 of 7**

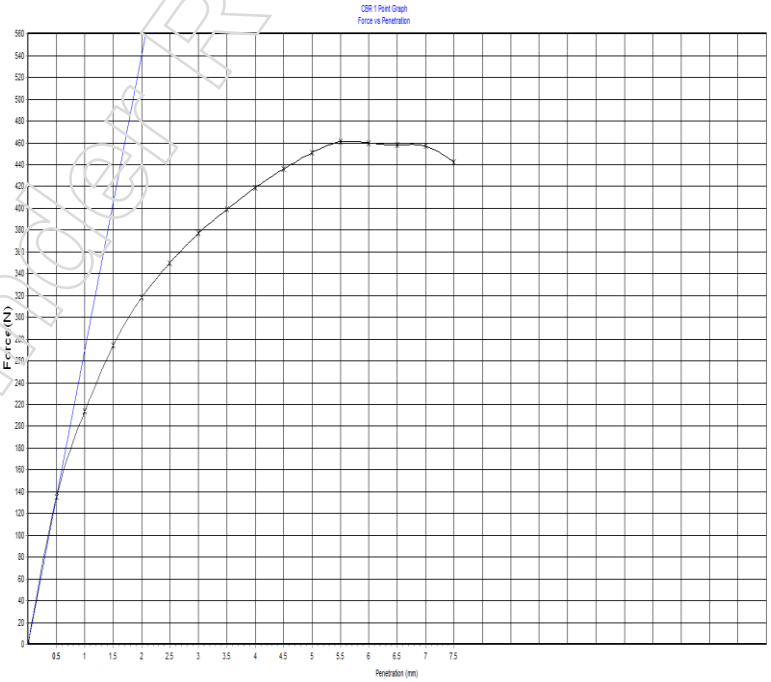
Sample Number :	D20-488
Date Sampled :	30/06/2020
Date Tested :	2/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-67 - E:0311773 N:6991968
Subgrade
TRN - 0226

Lot Number :	BH-67
Test Number :	1

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.72
Optimum Moisture Content (%) :	17.5
Compactive Effort :	Standard
Nominated Percentage of MDD :	100
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100
Achieved Percentage of OMC :	99.0
Dry Density Before Soak (t/m³) :	1.72
Dry Density After Soak (t/m³) :	1.66
Moisture Content Before Soak (%) :	17.3
Moisture Content After Soak (%) :	21.4
Density Ratio After Soak (%) :	97.00
Field Moisture Content (%) :	14.8
Top Moisture Content - After Penetration (%) :	24.5
Total Moisture Content - After Penetration (%) :	21.5
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	4.0



CBR Surcharge (kg) :	4.5	Bearing Ratio 2.5mm (%) :	2.5
Oversize (%) :		Bearing Ratio 5.0mm (%) :	**2.5**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2.5**

Site Selection :	Random
Soil Description :	

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NATA Accreditation Number :

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Document Code RF39-13

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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 5/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		**Page 2 of 7**

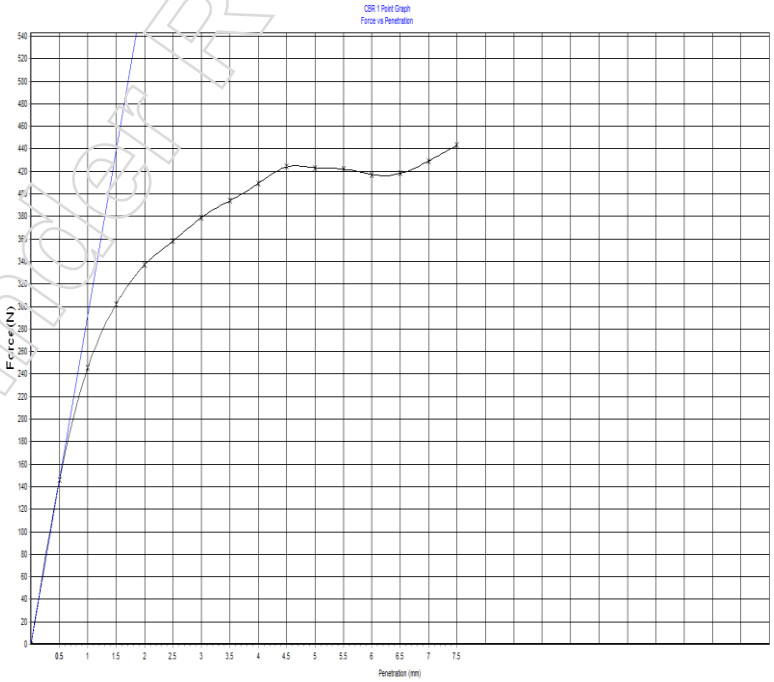
Sample Number :	D20-489
Date Sampled :	30/06/2020
Date Tested :	2/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-66 - E:0311383 N:6992312
Subgrade
TRN - 0226

Lot Number :	BH-66
Test Number :	1

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.63
Optimum Moisture Content (%) :	20.5
Compactive Effort :	Standard
Nominated Percentage of MDD :	100
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100
Achieved Percentage of OMC :	100.0
Dry Density Before Soak (t/m³) :	1.63
Dry Density After Soak (t/m³) :	1.58
Moisture Content Before Soak (%) :	20.5
Moisture Content After Soak (%) :	21.9
Density Ratio After Soak (%) :	97.00
Field Moisture Content (%) :	20.5
Top Moisture Content - After Penetration (%) :	24.2
Total Moisture Content - After Penetration (%) :	21.9
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	3.5
CBR Surcharge (kg) :	4.5
Oversize (%) :	
Oversize Material Replaced (%) :	



Bearing Ratio 2.5mm (%) :	2.5
Bearing Ratio 5.0mm (%) :	**2**
CBR Value (%) :	**2.5**

Site Selection :	Random
Soil Description :	

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M: NR
E: admin@ctqs.com.au

California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 5/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		**Page 3 of 7**

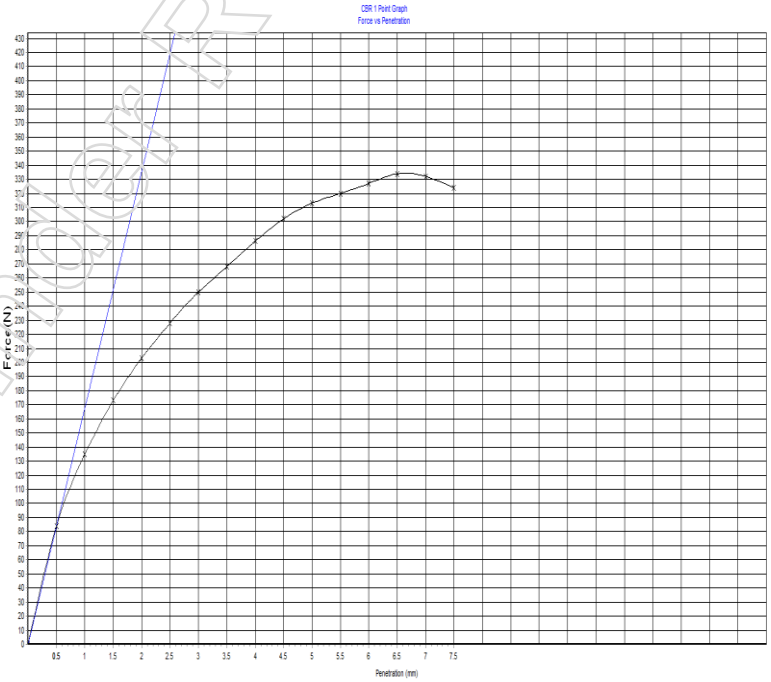
Sample Number :	D20-490
Date Sampled :	30/06/2020
Date Tested :	2/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-65 - E:0310963 N:6992587
Subgrade
TRN - 0226

Lot Number :	BH-65
Test Number :	1

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.70
Optimum Moisture Content (%) :	17.5
Compactive Effort :	Standard
Nominated Percentage of MDD :	100
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100
Achieved Percentage of OMC :	99.0
Dry Density Before Soak (t/m³) :	1.70
Dry Density After Soak (t/m³) :	1.59
Moisture Content Before Soak (%) :	17.3
Moisture Content After Soak (%) :	24.0
Density Ratio After Soak (%) :	94.00
Field Moisture Content (%) :	15.8
Top Moisture Content - After Penetration (%) :	27.2
Total Moisture Content - After Penetration (%) :	24.1
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	7.0



CBR Surcharge (kg) :	4.5	Bearing Ratio 2.5mm (%) :	1.5
Oversize (%) :		Bearing Ratio 5.0mm (%) :	**1.5**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**1.5**

Site Selection :	Random
Soil Description :	

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E: admin@ctqs.com.au

California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 5/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		**Page 4 of 7**

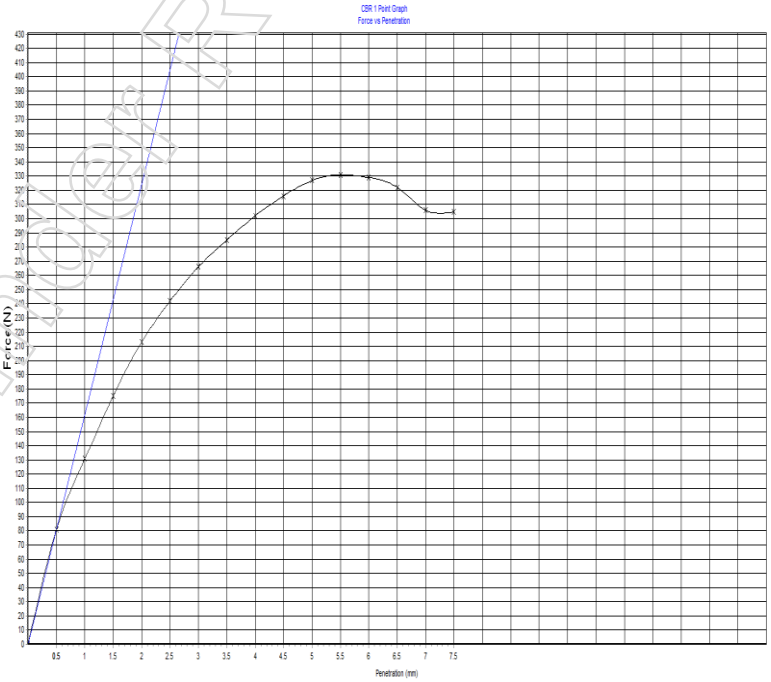
Sample Number :	D20-491
Date Sampled :	30/06/2020
Date Tested :	2/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-64 - E:0310518 N:6992831
Subgrade
TRN - 0226

Lot Number : BH-64
Test Number : 1

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.68
Optimum Moisture Content (%) :	19.0
Compactive Effort :	Standard
Nominated Percentage of MDD :	100
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100
Achieved Percentage of OMC :	101.0
Dry Density Before Soak (t/m³) :	1.68
Dry Density After Soak (t/m³) :	1.58
Moisture Content Before Soak (%) :	19.1
Moisture Content After Soak (%) :	26.2
Density Ratio After Soak (%) :	94.00
Field Moisture Content (%) :	18.3
Top Moisture Content - After Penetration (%) :	28.8
Total Moisture Content - After Penetration (%) :	26.3
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	6.0



CBR Surcharge (kg) :	4.5	Bearing Ratio 2.5mm (%) :	2
Oversize (%) :		Bearing Ratio 5.0mm (%) :	**1.5**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2**

Site Selection :	Random
Soil Description :	

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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 5/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**		**Page 5 of 7**

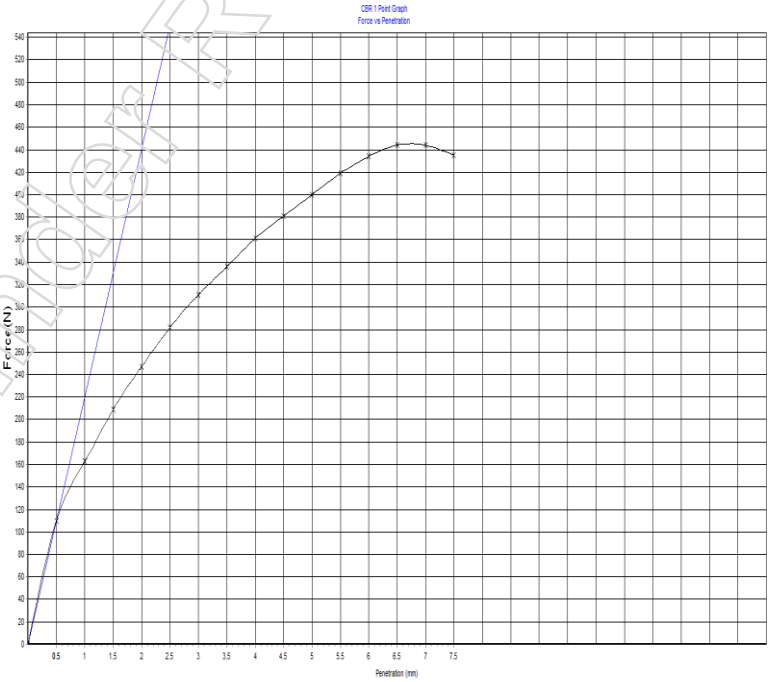
Sample Number :	D20-492
Date Sampled :	30/06/2020
Date Tested :	2/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-63 - E:0310084 N:6993084
Subgrade
TRN - 0226

Lot Number : BH-63
Test Number : 1

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.72
Optimum Moisture Content (%) :	16.5
Compactive Effort :	Standard
Nominated Percentage of MDD :	100
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	101
Achieved Percentage of OMC :	99.0
Dry Density Before Soak (t/m³) :	1.73
Dry Density After Soak (t/m³) :	1.61
Moisture Content Before Soak (%) :	16.3
Moisture Content After Soak (%) :	23.2
Density Ratio After Soak (%) :	94.00
Field Moisture Content (%) :	13.4
Top Moisture Content - After Penetration (%) :	26.0
Total Moisture Content - After Penetration (%) :	23.1
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	7.0



CBR Surcharge (kg) :	4.5	Bearing Ratio 2.5mm (%) :	2
Oversize (%) :		Bearing Ratio 5.0mm (%) :	**2**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2**

Site Selection :	Random
Soil Description :	

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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 5/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**	**Page 6 of 7**	

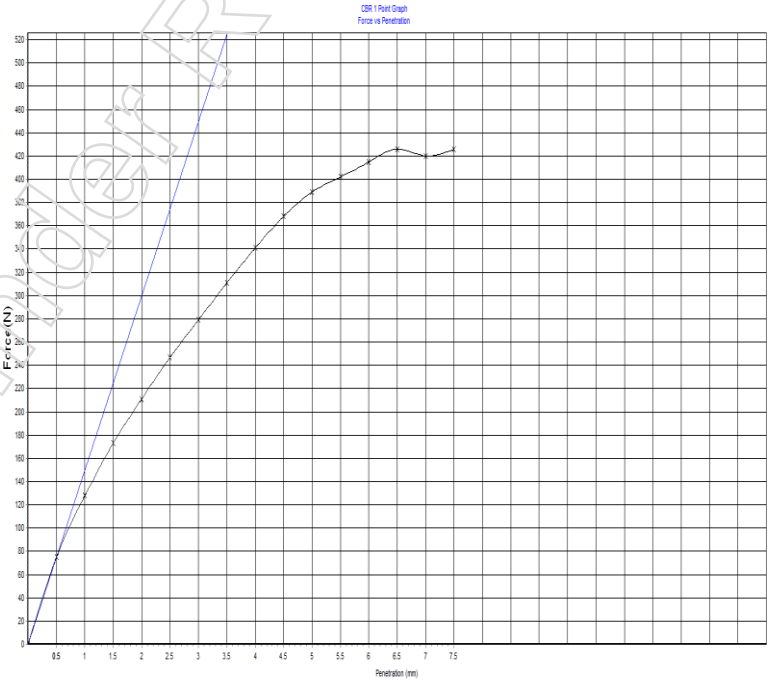
Sample Number :	D20-493
Date Sampled :	30/06/2020
Date Tested :	2/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-62 - E:0309639 N:6993327
Subgrade
TRN - 0226

Lot Number : BH-62
Test Number : 1

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.71
Optimum Moisture Content (%) :	14.5
Compactive Effort :	Standard
Nominated Percentage of MDD :	100
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100
Achieved Percentage of OMC :	101.0
Dry Density Before Soak (t/m³) :	1.71
Dry Density After Soak (t/m³) :	1.58
Moisture Content Before Soak (%) :	14.6
Moisture Content After Soak (%) :	24.7
Density Ratio After Soak (%) :	92.00
Field Moisture Content (%) :	13.6
Top Moisture Content - After Penetration (%) :	27.2
Total Moisture Content - After Penetration (%) :	24.6
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	8.0



CBR Surcharge (kg) :	4.5	Bearing Ratio 2.5mm (%) :	2
Oversize (%) :		Bearing Ratio 5.0mm (%) :	**2**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2**

Site Selection :	Random
Soil Description :	

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California Bearing Ratio Report (1 Point)

Client :	**M J Smith Group**	Report Number:	**39 - 5/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Number :	**39**	Order Number :	
Project Name :	**Pavement Investigation**	Test Method :	**Q113C**
Location:	**Daandine Nandi Road , Dalby**	**Page 7 of 7**	

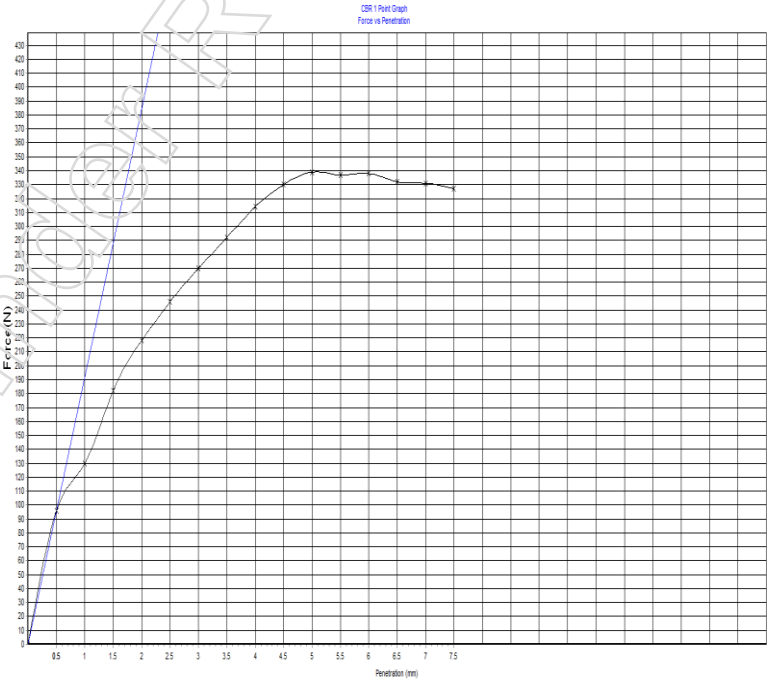
Sample Number :	D20-494
Date Sampled :	30/06/2020
Date Tested :	2/07/2020
Sampled By :	NR
Sampling Method :	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material
Material Type :	Subgrade
Remarks :	

SAMPLE LOCATION

Daandine Nandi Road
BH-61 - E:0309201 N:6993582
Subgrade
TRN - 0226

Lot Number : BH-61
Test Number : 1

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.70
Optimum Moisture Content (%) :	17.0
Compactive Effort :	Standard
Nominated Percentage of MDD :	100
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100
Achieved Percentage of OMC :	100.0
Dry Density Before Soak (t/m³) :	1.70
Dry Density After Soak (t/m³) :	1.60
Moisture Content Before Soak (%) :	17.0
Moisture Content After Soak (%) :	23.3
Density Ratio After Soak (%) :	94.00
Field Moisture Content (%) :	14.5
Top Moisture Content - After Penetration (%) :	26.4
Total Moisture Content - After Penetration (%) :	23.3
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	6.0



CBR Surcharge (kg) :	4.5	Bearing Ratio 2.5mm (%) :	2
Oversize (%) :		Bearing Ratio 5.0mm (%) :	**1.5**
Oversize Material Replaced (%) :		**CBR Value (%) :**	**2**

Site Selection :	Random
Soil Description :	

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NATA Accreditation Number :
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Document Code RF39-13

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Atterberg Limits Report

Client :	**M J Smith Group**	Report Number:	**39 - 1/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Name :	**Pavement Investigation**	Order Number :	
Project Number :	**39**	Test Method :	**AS1289.3.9.2, 3.2.1, 3.3.1, 3.3.2 & 3.4.1**
Location:	**Daandine Nandi Road , Dalby**	**Page 1 of 2**	

Sample Number :	D20-488	D20-489	D20-490	D20-491
Test Number :	1	1	1	1
Date Sampled :	30/06/2020	30/06/2020	30/06/2020	30/06/2020
Date Tested :	2/07/2020	2/07/2020	2/07/2020	2/07/2020
Sampled By :	NR			
Sampling Method :	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material	Insitu Material	Insitu Material	Insitu Material
Material Type :	Subgrade	Subgrade	Subgrade	Subgrade
Sample Location :	**Daandine Nandi Road** **BH-67 - E:0311773 N:6991968** **Subgrade** **TRN - 0226**	**Daandine Nandi Road** **BH-66 - E:0311383 N:6992312** **Subgrade** **TRN - 0226**	**Daandine Nandi Road** **BH-65 - E:0310963 N:6992587** **Subgrade** **TRN - 0226**	**Daandine Nandi Road** **BH-64 - E:0310518 N:6992831** **Subgrade** **TRN - 0226**
Lot Number :	BH-67	BH-66	BH-65	BH-64
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Sample History :	Oven Dried	Oven Dried	Oven Dried	Oven Dried
Sample Preparation :	Wet	Wet	Wet	Wet
Notes :	Cracking & Curling Occured	Cracking & Curling Occured	Cracking & Curling Occured	Cracking & Curling Occured
Mould Length (mm) :	250	250	250	250
Liquid Limit (%) :	47	46	50	50
Plastic Limit (%) :	15	17	18	15
Plasticity Index (%) :	32	29	32	35
Linear Shrinkage (%) :	16.5	15	16	17
SPECIFICATION DETAILS				
Specification Number :				
Liquid Limit - Max :				
Plasticity Index - Max :				
Linear Shrinkage - Max :				
Remarks :	-			

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M: NR
E: admin@ctqs.com.au

Atterberg Limits Report

Client :	**M J Smith Group**	Report Number:	**39 - 1/1**
Address :	**Commodity Court, Dalby, QLD, 4405**	Report Date :	**7/07/2020**
Project Name :	**Pavement Investigation**	Order Number :	
Project Number :	**39**	Test Method :	**AS1289.3.9.2, 3.2.1, 3.3.1, 3.3.2 & 3.4.1**
Location:	**Daandine Nandi Road , Dalby**	**Page 2 of 2**	

Sample Number :	D20-492	D20-493	D20-494
Test Number :	1	1	1
Date Sampled :	30/06/2020	30/06/2020	30/06/2020
Date Tested :	2/07/2020	2/07/2020	2/07/2020
Sampled By :	NR		
Sampling Method :	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)	AS1289.1.2.1 (6.5.3)
Material Source :	Insitu Material	Insitu Material	Insitu Material
Material Type :	Subgrade	Subgrade	Subgrade
Sample Location :	**Daandine Nandi Road** **BH-63 - E:0310084 N:6993084** **Subgrade** **TRN - 0226**	**Daandine Nandi Road** **BH-62 - E:0309639 N:6993327** **Subgrade** **TRN - 0226**	**Daandine Nandi Road** **BH-61 - E:0309201 N:6993582** **Subgrade** **TRN - 0226**
Lot Number :	BH-63	BH-62	BH-61
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Sample History :	Oven Dried	Oven Dried	Oven Dried
Sample Preparation :	Wet	Wet	Wet
Notes :	Cracking & Curling Occured	Cracking & Curling Occured	Cracking & Curling Occured
Mould Length (mm) :	250	250	250
Liquid Limit (%) :	50	45	49
Plastic Limit (%) :	19	15	18
Plasticity Index (%) :	31	30	31
Linear Shrinkage (%) :	15	15	16
SPECIFICATION DETAILS			
Specification Number :			
Liquid Limit - Max :			
Plasticity Index - Max :			
Linear Shrinkage - Max :			
Remarks :	-		

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NATA Accreditation Number : NR

GEOTECHNICAL SURVEY SGP DAANDINE NANDI ROAD

FACTUAL REPORT

Revision	Date	Prepared by	Reviewed by position	Reviewed by	Reviewed by position
Draft	6/05/2021	NR	Business Development Officer (Civil Engineer)	NR	Manager of Technical Service
Rev 0	24/05/2021		Business Development Officer (Civil Engineer)		Manager of Technical Service

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7.2 Description of Laboratory Testing 9

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Appendix A 10

Appendix B 12

Appendix C 180

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1.0 Introduction

This factual report presents the findings of the geotechnical site investigation undertaken by Construction Testing and Quality Services (CTQS) on behalf of Arrow Energy (Client) for the proposed intersection upgrade of Daandine Nandi Road.

The Scope of Services performed under this Purchase Order, awarded to MJ Smith Ground Preparation Pty Ltd, requires geotechnical investigation at nine (9) boreholes along Daandine Nandi Road located within the precinct of the Surat Gas Project. Construction material testing was conducted at each bore hole in accordance with the test methods and frequencies nominated by the Client. Refer to Appendix A.

2.0 Site Description

Daandine Nandi Road is located approximately 10km south west of the town of Dalby in the Western Downs Region (South Queensland). Access to the Daandine Nandi Road is located off the Moonie Highway. All bore holes are located within the Daandine Nandi Road pavement extents. It was noted that all locations were free of flood/ storm water and organic growth. The terrain of the surrounding area is of a horticultural nature with established tree and vegetation growth within the road corridor. Road drainage is minimal given the surrounding flat terrain.

3.0 Regional Geology

Reference to geological mapping by the Geological Survey of Queensland 1:100 000 Series 9143 Dalby, published in 2018 by Queensland State Government indicates that the soil is of Middle Jurassic – Later Jurassic age and typically comprises of shale, siltstone, sandstone and coal seams.

The subsurface profile encountered when drilling along Daandine Nandi road was predominantly silty clays below the constructed pavement gravel layers. There were no notable weather events prior to investigative activities that could potentially impact the results.

4.0 Information Supplied By Others

CTQS has been provided with the following information by the Client:

- Scope of Services - S00B01-ARW-PMC-SOW-00007 – Geotechnical Survey SGP Daandine Nandi Road.

For the purpose of this site investigation and accordance with the geotechnical investigation brief, the below testing shall be carried out by third-party NATA certified facilities:

- Unconfined Compressive Strength & Lime Demand Test – Nominated Laboratory *Superior Quarry Testing, Toowoomba.*
- Capillary Rise Test, Organic Content and Sulfate Content – Nominated laboratory *Coffey, Brisbane*.
- Ferrous Oxide FeO – Nominated laboratory *ALS Environmental, Brisbane.*

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5.0 Field Methods

5.1 General

All field sampling, testing and visual assessments were undertaken by a qualified employee of CTQS, in accordance the relevant Australian Standard methods and CTQS-SP02 Sampling Procedure. Fieldwork was undertaken on the 10th March 2021, as per the provided scope of services document. It was noted that there were no amendments or deviations from the scope of services.

The following figures identify the borehole locations predetermined in Scope of Services document provided by the Client.

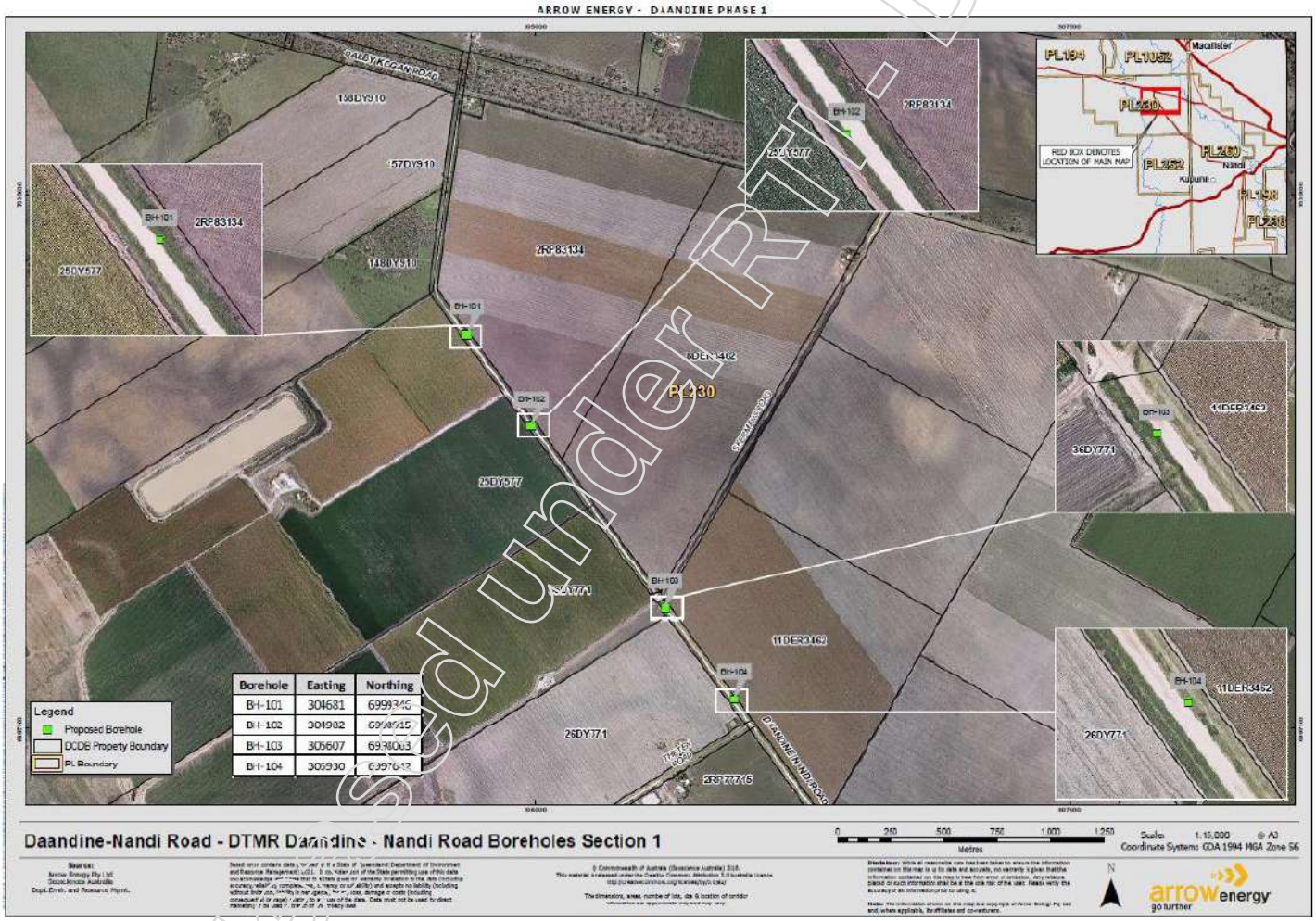


Figure 5.1 – Daandine Nandi Road – DTMR Daandine Nandi Boreholes Section 1

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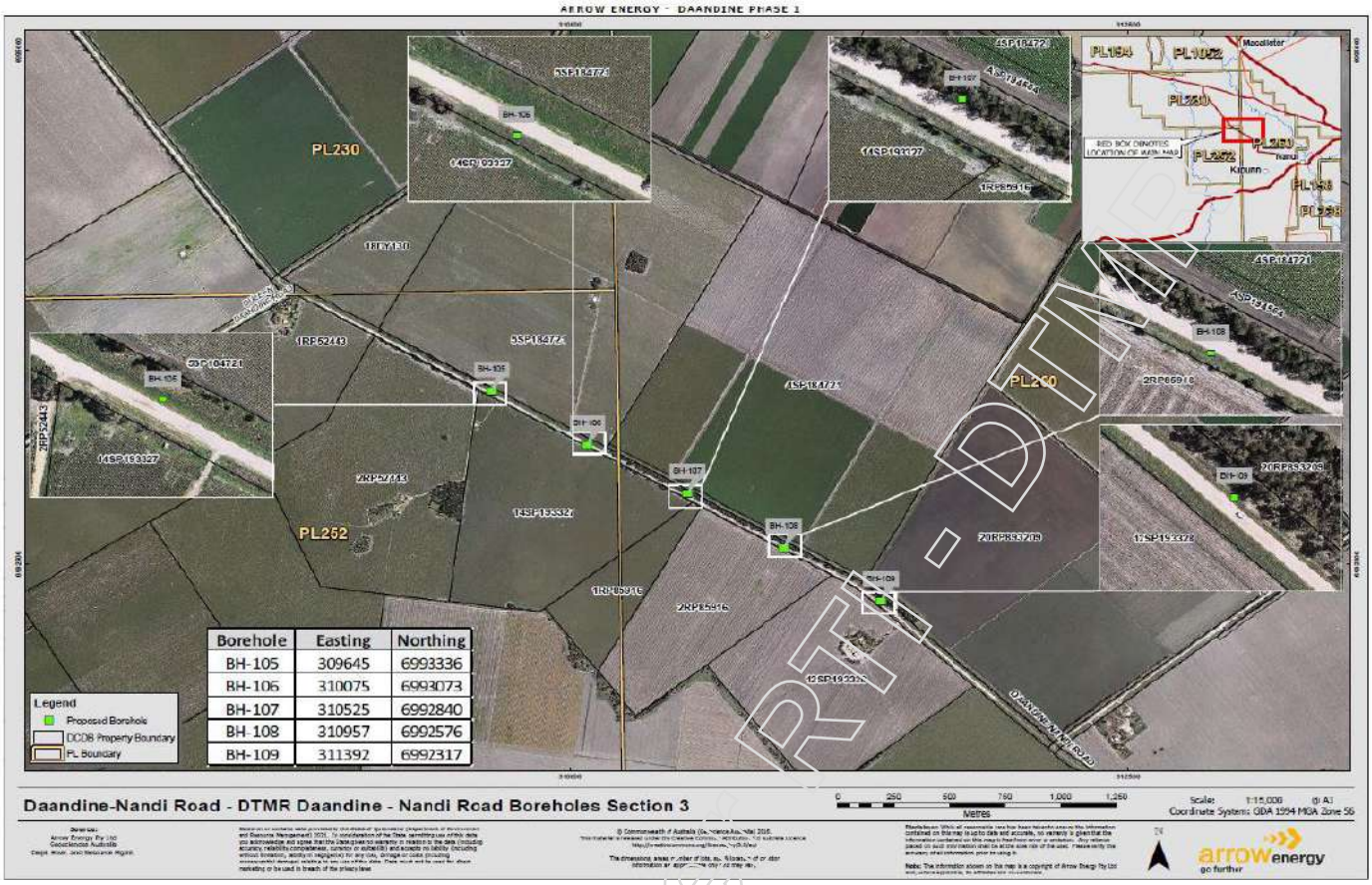


Figure 5.2 – Daandine Nandi Road – DTMR Daandine Nandi Borehole Section 3

No free groundwater ingress was noted during auger drilling. The pavement subgrade was found to be of stable nature. It was noted that there was no evidence of internal borehole walls collapsing at any stage during the investigative activities.

Site photographs were taken at each borehole location and included the following details:

- Investigative drilled borehole and pavement layer depth.
- Borehole locality – Cross sectional road view.

All site photographs pertaining to this site investigation are attached, refer to Appendix C.

On completion of investigative activities, each borehole was backfilled with suitable pavement material. Material was manually placed into each borehole in layers and compacted using a trailer mounted compaction device.

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5.2 Field Work Results

Each borehole was drilled to the nominated maximum depth of 1500mm using a utility-mounted Drillman GT-10 drilling rig and auger attachment with a diameter of 250mm. No issues were encountered drilling to this depth.

Borehole logs were undertaken by visual assessment of the soil characteristics which were recorded at each layer depth. Detailed borehole logs and dynamic cone penetrometer (DCP) test results are attached, refer to Appendix B. The below table summarises the DCP results.

DCP	BH-101	BH-102	BH-103	BH-104	BH-105	BH-106	BH-107	BH-108	BH-109
Start Depth (mm)	Subgrade	Subgrade	Subgrade	Subgrade	Subgrade	Subgrade	Subgrade	Subgrade	Subgrade
0-100	6	5	7	6	5	6	7	5	6
100-200	8	4	7	5	4	6	5	5	5
200-300	7	7	7	6	5	6	5	6	5
300-400	7	6	6	6	6	9	7	5	7
400-500	7	6	6	8	6	7	8	8	8
500-600	6	8	5	7	9	7	8	7	8
600-700	5	7	8	8	8	6	8	7	6
700-800	8	9	7	6	7	8	7	8	7
800-900	9	9	6	6	7	8	6	9	6
900-1000	8	7	6	8	8	7	9	10	9
1000-1100	7	8	8	7	8	7	9	8	8
1100-1200	8	8	8	6	7	5	10	9	10
1200-1300	10	8	8	6	7	6	11	9	12
1300-1400	10	9	9	9	8	7	10	11	9
1400-1500	9	10	9	7	10	8	10	12	11

Table 1 – Dynamic Cone Penetrometer Test Results.

5.3 Excavatability

Based on the borehole log conditions reported and dynamic cone penetrometer results, it is estimated that the excavation of the silty clays found below pavement layers are of very low strength. Potential excavation activities could be carried out using small size excavation plant.

Where excavation is proposed beyond 1.5m depth of investigation, then it is recommended that further cored borehole drilling activities are undertaken to identify the strength and nature of the material below.

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6.0 Laboratory Testing

Geotechnical laboratory testing comprised of the following for each borehole:

- Singe Point CBR – 4 day soaked (AS1289.6.1.1)
- Atterberg Limits (Incl WPI) (AS1289.3.9.2, AS1289.3.2.1, AS1289.3.3.2 & AS1289.3.4.1)
- Lime Demand Testing (Q133)
- Unconfined Compressive Strength Test (Q115)
- Capillary Rise Test (Q125D)
- Organic Content (Q120B)
- Sulfate Content (AS1289.4.2.1)
- Ferrous Oxide
- Particle Size Distribution (Q103A)
- Insitu Moisture Content at depth approximately 600mm.

Detailed laboratory test reports are attached in Appendix B of this document. The tables below summarised these laboratory results.

Bore Hole Number	BH-101	BH-102	BH-103	BH-104	BH-105	BH-106	BH-107	BH-108	BH-109
Lime Demand %	4.0	3.5	3.5	3.0	5.0	3.0	3.0	3.5	3.0
UCS 0%	0.4	0.4	0.5	0.5	0.6	0.4	0.5	0.4	0.4
USC LD-2	0.8	1.1	0.7	0.5	1.5	0.6	0.5	0.5	0.5
UCS LD	1.9	1.7	1.0	1.2	1.2	1.6	1.1	0.8	1.1
UCS LD+2	1.7	1.9	1.9	1.2	2.4	2.0	1.8	1.1	1.3
UCS LD +4	2.0	1.8	1.6	1.9	1.4	2.2	1.2	1.1	1.2
MDD 0%	1.74	1.81	1.78	1.75	1.7	1.71	1.68	1.64	1.74
MDD LD-2	1.73	1.75	1.72	1.72	1.62	1.69	1.64	1.61	1.72
MDD LD	1.69	1.72	1.7	1.68	1.59	1.63	1.61	1.57	1.69
MDD LD+2	1.66	1.70	1.68	1.66	1.57	1.61	1.58	1.57	1.68
MDD LD +4	1.66	1.69	1.66	1.63	1.57	1.57	1.59	1.56	1.66
OMC 0%	18.9	16.4	17.8	17.9	19.5	19.3	19.9	20.1	17.6
OMC LD-2	18.1	16.3	17.9	18.6	21.5	18	20.4	21.5	17.7
OMC LD	18.5	17.0	17.5	19.1	19.1	19.5	20.3	21.1	18.6
OMC LD+2	18.2	17.1	19.3	18.5	22.0	20.0	22.3	20.5	17.4
OMC LD +4	18.8	17.0	18.5	19.6	19.5	20.6	19.6	20.2	17.2

Table 2 – Test Results for Lime Demand and Unconfined Compressive Strength tests.

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Test Method	BH-101	BH-102	BH-103	BH-104	BH-105	BH-106	BH-107	BH-108	BH-109
Liquid Limit	52	51	52	51	51	51	54	56	58
Plastic Limit	20	20	19	20	18	18	20	19	20
Plasticity Index	32	31	33	31	33	33	34	37	38
Linear Shrinkage	16	15.5	17	16	16.5	17	17	19	19
WPI	2691	2613	2841	2628	2786	2948	2906	3267	3553
Fines Ratio	0.75	0.74	0.73	0.78	0.82	0.82	0.85	0.89	0.84
PSD 19mm	100	100	100	100	100	100	100	100	100
PSD 4.75	98	98	99	97	97	97	99	99	99
PSD 2.36	92	96	95	95	94	94	94	94	95
PSD 0.425	84	84	86	85	84	88	85	88	94
PSD 0.075	63	62	63	66	69	73	73	78	79
CBR	2	2.5	3	2.5	1.5	2.5	2.5	2	2.5

Table 3 – Test Results for Atterberg, Particle Size Distribution and California Bearing Ratio tests.

Borehole	Sample Number	Initial Height of Specimen (mm)	Rise Time (hrs)	Capillary Rise (%)
BH-101	4325	113	1.0	100
BH-101	4326	113	1.0	100
BH101	4327	113	2.0	100
BH-102	4330	113	1.5	100
BH-102	4331	114	1.5	100
BH-102	4332	114	2.0	100
BH-103	4335	115	1.0	100
BH-103	4336	114	1.5	100
BH-103	4337	115	1.5	100
BH-104	4339	113	0.5	100
BH-104	4341	114	1.0	100
BH-104	4342	114	2.0	100
BH-105	4345	113	1.0	100
BH-105	4346	113	2.5	100
BH-105	4347	113	2.0	100
BH-106	4870	114	1.0	100
BH-106	4872	113	1.5	100
BH-106	4874	113	1.5	100
BH-107	4355	114	1.0	100
BH-107	4356	113	2.5	100
BH-107	4357	113	1.5	100
BH-108	4360	115	1.0	100
BH-108	4361	114	1.0	100
BH-108	4362	115	1.5	100
BH-109	4365	115	1.5	100
BH-109	4366	114	2.0	100
BH-109	4367	115	3.0	100

Table 4 – Test Results for Capillary Rise tests.

7.0 Laboratory Testing

7.1 Storage and Transport of Samples for Testing

Field samples were transported to the laboratory in accordance with *SP03 Receipt, Registration & Storage of Samples Procedure*. Sampled material that was not required to be tested, shall be retained in accordance with *SP03 Receipt, Registration & Storage of Samples Procedure* and disposed of on the 10th June 2021, unless otherwise directed by the Client.

7.2 Description of Laboratory Testing

All laboratory testing was completed in accordance with the relevant Australian Standards Test Methods or Department of Main Roads Testing Manual and CTQS *SP03 Receipt, Registration & Storage of Samples Procedure* and *SP06 Reporting Test Results Procedure*.

Any laboratory testing required that does not fall under Construction Testing and Quality Services NATA Scope of Accreditation was sent and tested by a third-party NATA accredited facility. Refer to *Section 4.0 Information Supplied By Others*, for further third-party suppliers information.

8.0 References

The following Standards and references were used in preparation of this report:

- AS 1289 Methods of Testing Soils For Engineering Purposes.
- Materials Testing Manual, Edition 5, Amendment 4, September 2020, The State of Queensland (Department of Transport and Main Roads).
- AS 1726-2017 Geotechnical Site Investigations.
- DNRME Queensland Geoscience Data, Map Collection, Geology 9143 Dalby Sheet 1:100 000 (2018)

The following internal manuals, policies and procedures were used in preparation of this report:

- Laboratory Quality Manual Rev 0
- SP02 Sampling Procedure Rev 0
- SP03 Receipt, Registration & Storage of Samples Procedure Rev 0
- SP06 Reporting Test Results Procedure Rev 0

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Appendix A
Nominated Test Methods and Frequencies

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Test Description	BH101	BH102	BH103	BH104	BH105	BH106	BH107	BH108	BH109
1 No. single point 4 day soaked CBR's including swell values at nominal 200-600mm below existing Subgrade level on shoulder of Daandine Nandi Road. Testing to be undertaken at 95% MDD, 100% OMC. Curing time to be determined in accordance with Atterberg test results (not visual). Plus 1No. DCP per location to 1.5m depth	1	1	1	1	1	1	1	1	1
1.No Atterberg's (Q104, 105 and 106) incl WPI	1	1	1	1	1	1	1	1	1
Each Bore hole Location: 1 No Lime Demand Testing (Q133) - multiple samples @ various lime contents to determine minimum % lime required to achieve pH 12. 5 No UCS tests @ 28 days (Q115) at 97% MDD and 100% OMC (0% lime, LD-2%, LD, LD +2%, LD +4%). 3 No. Capillary Rise tests (Q125D) at LD, LD +2% and LD +4%. (The GTA should source fresh hydrated lime and undertake Available Lime Index testing (AS4489.6.1))	1	1	1	1	1	1	1	1	1
1. No Organic Content (Q120B) 1. No Sulfate Content (AS1289.4.2.1) 1. No Ferrous Oxide FeO 1. No PSD (Q103A) 1. No insitu moisture content at depth of approx. 600mm	1	1	1	1	1	1	1	1	1
Visual classification of subgrade materials and measurement of depth of existing pavement depth adjacent to seal;	1	1	1	1	1	1	1	1	1
Locations of testing to be recorded by reference to centre of Daandine Nandi Road and/or GPS coordinates;	1	1	1	1	1	1	1	1	1

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Appendix B
Laboratory Test Result Reports

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WS27 Borelog Report

Borehole Number: **BH-101**	Easting: **311396.5**	Northing: **6992312.5**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By: NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
200 250 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

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WS27 Borelog Report

Borehole Number: **BH-102**	Easting: **310957.7**	Northing: **6992581.6**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By: NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
200 250 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

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WS27 Borelog Report

Borehole Number: **BH-103**	Easting: **310523.1**	Northing: **6992830.4**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By: NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
200 250 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

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WS27 Borelog Report

Borehole Number: **BH-104**	Easting: **310075.2**	Northing: **6993081.2**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150 200	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
250 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

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WS27 Borelog Report

Borehole Number: **BH-105**	Easting: **309640.2**	Northing: **6993329.8**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By: NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150 200 250	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

Released under RTI DTMR

WS27 Borelog Report

Borehole Number: **BH-106**	Easting: **305927.6**	Northing: **6997636.9**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By: NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150 200 250	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

Released under RTI DTMR

WS27 Borelog Report

Borehole Number: **BH-107**	Easting: **305605.9**	Northing: **6998068.7**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By: NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150 200	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
250 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

Released under RTI - DTMR

WS27 Borelog Report

Borehole Number: **BH-108**	Easting: **304982.0**	Northing: **6998930.8**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By: NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150 200	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
250 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

Released under RTI - DTMR

WS27 Borelog Report

Borehole Number: **BH-109**	Easting: **304678.2**	Northing: **6999339.9**
Client: **M J Smith Group**	Surface RL:	Hole Diamter: **250mm**
Location: **Daandine Nandi Road**	Project: **Pavement Investigation**	Method: **Auger Drilling**

Depth (mm)	Logged By: NR Date: 09/03/2021 MATERIAL DESCRIPTION	FILL	CLASSIFICATION SYMBOL	ESTIMATED I_{SS} %	COLOUR	MOISTURE CONTENT	CONSISTENCY	DCP (Blows/100mm)	SAMPLE (D/UD)	PP kPa	STANDARD PENETRATION TEST (SPT)
50 100 150 200 250	Sandy GRAVEL	Y	GM		Light Brown	Dry	Dense				
300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500	Silty CLAY	N	CH		Black	Moist	Stiff		D		

Hole Terminated depth achieved

Released under RTI DTMR

Material Test Report

Report Number: P21054-1
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309A
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-101 E: 311396.5, N: 6992312.5**

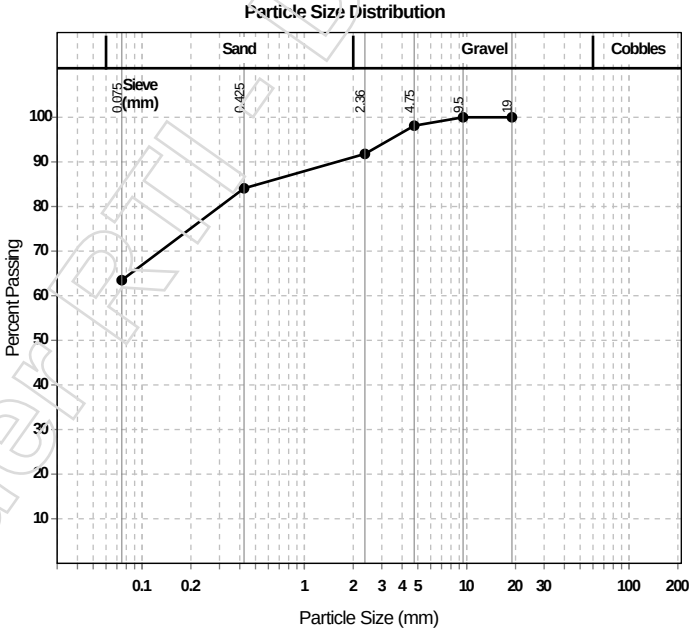
CTQS Construction Testing & Quality Services
Western Downs Laboratory
14 Sandalwood Avenue West Dalby Qld 4405
Phone: NR
Email: NR ctqs.com.au

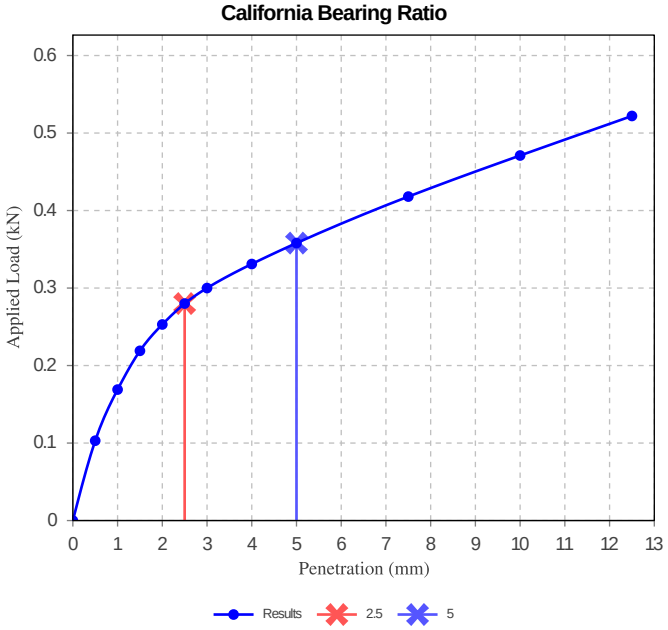
Accredited for compliance with ISO/IEC 17025 - Testing
NR
Approved Signatory: NR
Manager of Technical Services
NATA Accredited Laboratory Number: NR

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
9.5 mm	**100**		
4.75 mm	**98**		
2.36 mm	**92**		
0.425 mm	**84**		
0.075 mm	**63**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	84		
Liquid Limit (%)	52		
Plastic Limit (%)	20		
Plasticity Index (%)	**32**		
Weighted Plasticity Index (%)	2691		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	16.0		
Cracking Crumbling Curling	Cracking & Curling		





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Material Test Report

Western Downs Laboratory
14 Sandalwood Avenue West Dalby Qld 4405
Phone: NR
Email: NR @ctqs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

NR

Approved Signatory: NR

Manager of Technical Services

NATA Accredited Laboratory Number: NR

Report Number: **P21054-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309A
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-101 E: 311396.5, N: 6992312.5**

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.0**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.69		
Optimum Moisture Content (%)	18.0		
Laboratory Density Ratio (%)	95.5		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.54		
Field Moisture Content (%)	16.0		
Moisture Content at Placement (%)	18.2		
Moisture Content Top 30mm (%)	28.5		
Moisture Content Rest of Sample (%)	20.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	207.2		
Swell (%)	4.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

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Material Test Report

Report Number: **P21054-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309B
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-102 E: 310957.7, N: 6992581.6**

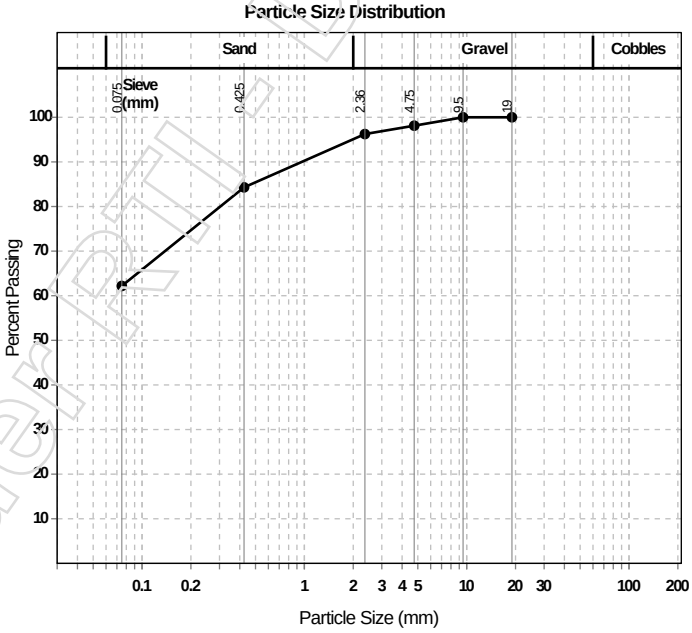
CTQS Construction Testing & Quality Services
Western Downs Laboratory
14 Sandalwood Avenue West Dalby Qld 4405
Phone: NR
Email: NR @ctqs.com.au

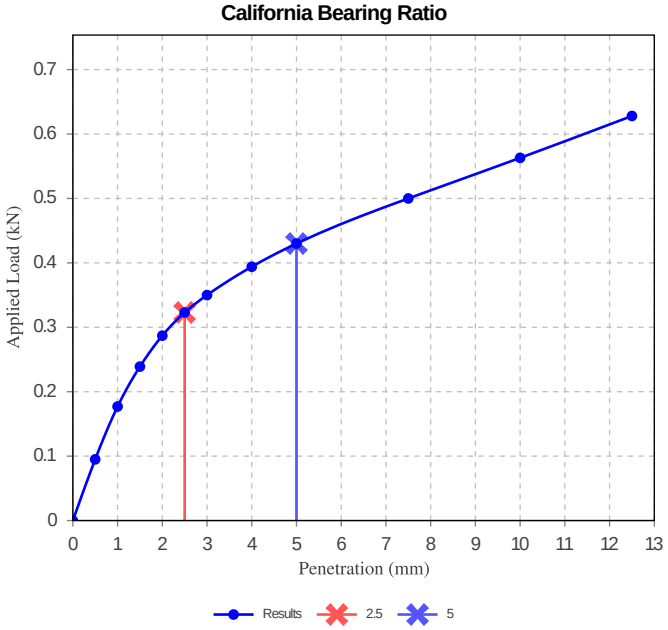
Accredited for compliance with ISO/IEC 17025 - Testing
NR
Approved Signatory: NR
Manager of Technical Services
NATA Accredited Laboratory Number: NR

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
9.5 mm	**100**		
4.75 mm	**98**		
2.36 mm	**96**		
0.425 mm	**84**		
0.075 mm	**62**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	84		
Liquid Limit (%)	51		
Plastic Limit (%)	20		
Plasticity Index (%)	**31**		
Weighted Plasticity Index (%)	2613		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	15.5		
Cracking Crumbling Curling	Cracking & Curling		





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Material Test Report

Report Number: **P21054-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309B
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-102 E: 310957.7, N: 6992581.6**

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California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.71		
Optimum Moisture Content (%)	17.0		
Laboratory Density Ratio (%)	95.0		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.58		
Field Moisture Content (%)	11.8		
Moisture Content at Placement (%)	16.9		
Moisture Content Top 30mm (%)	23.6		
Moisture Content Rest of Sample (%)	19.8		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	210.8		
Swell (%)	3.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

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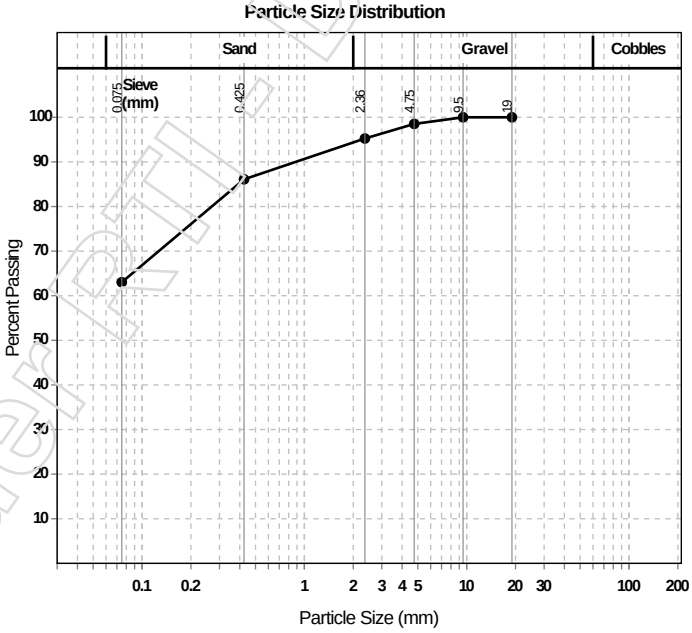
Report Number: **P21054-1**
Issue Number: 2 - *This version supersedes all previous issues*
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Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309C
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-103 E: 310523.1, N: 6992830.4**

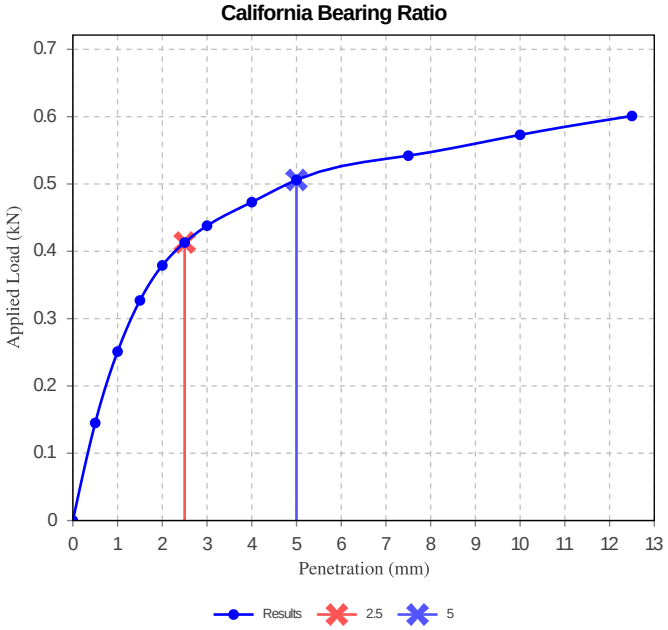
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Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
9.5 mm	**100**		
4.75 mm	**99**		
2.36 mm	**95**		
0.425 mm	**86**		
0.075 mm	**63**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	86		
Liquid Limit (%)	52		
Plastic Limit (%)	19		
Plasticity Index (%)	**33**		
Weighted Plasticity Index (%)	2841		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	17.0		
Cracking Crumbling Curling	Cracking & Curling		





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Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309C
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-103 E: 310523.1, N: 6992830.4**

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**3.0**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.68		
Optimum Moisture Content (%)	17.0		
Laboratory Density Ratio (%)	95.0		
Laboratory Moisture Ratio (%)	100.5		
Dry Density after Soaking (t/m^3)	1.54		
Field Moisture Content (%)	13.7		
Moisture Content at Placement (%)	17.2		
Moisture Content Top 30mm (%)	22.4		
Moisture Content Rest of Sample (%)	20.1		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	211.3		
Swell (%)	3.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

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Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309D
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-104 E: 310075.2, N: 6993081.2**

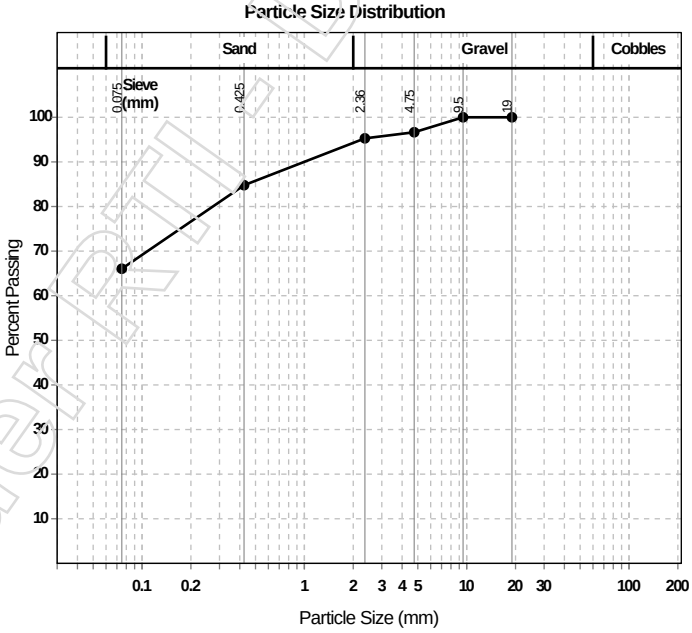
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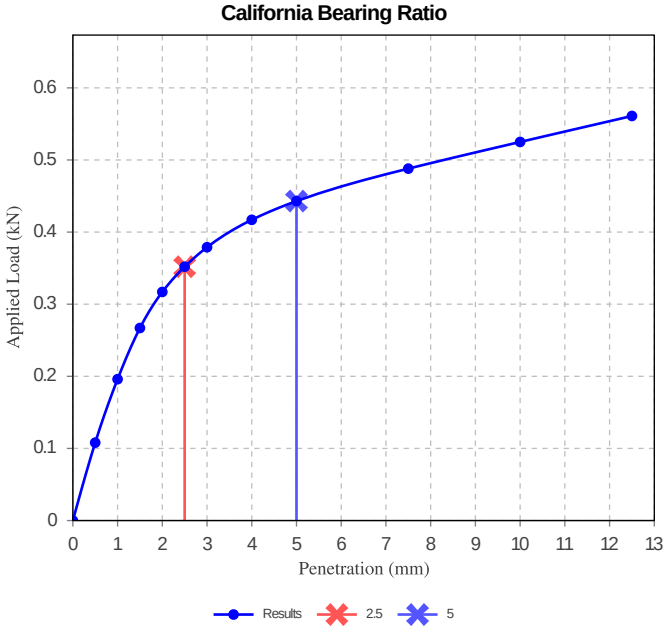
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Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
9.5 mm	**100**		
4.75 mm	**97**		
2.36 mm	**95**		
0.425 mm	**85**		
0.075 mm	**66**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	85		
Liquid Limit (%)	51		
Plastic Limit (%)	20		
Plasticity Index (%)	**31**		
Weighted Plasticity Index (%)	2628		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	16.0		
Cracking Crumbling Curling	Cracking & Curling		





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Issue Number: 2 - *This version supersedes all previous issues*
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Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309D
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-104 E: 310075.2, N: 6993081.2**

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.68		
Optimum Moisture Content (%)	18.0		
Laboratory Density Ratio (%)	95.0		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.53		
Field Moisture Content (%)	14.3		
Moisture Content at Placement (%)	18.0		
Moisture Content Top 30mm (%)	27.1		
Moisture Content Rest of Sample (%)	21.6		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	211.5		
Swell (%)	4.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

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Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309E
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-105 E: 309640.2, N: 6993329.8**

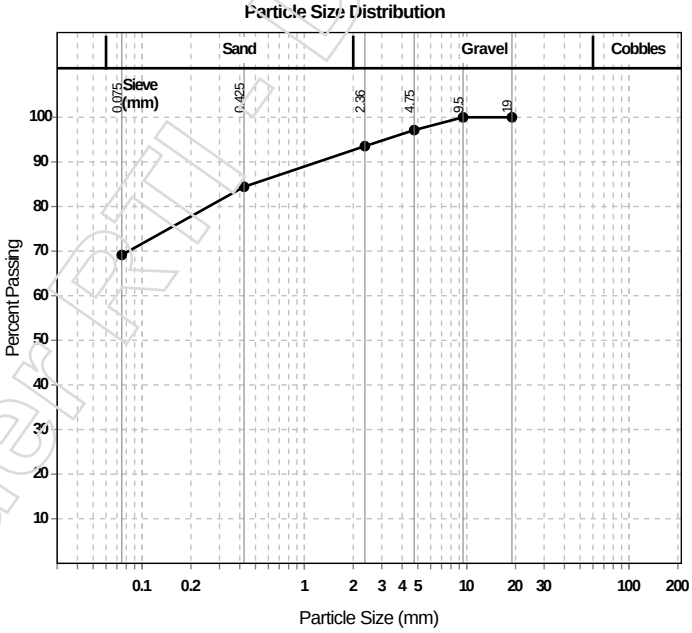
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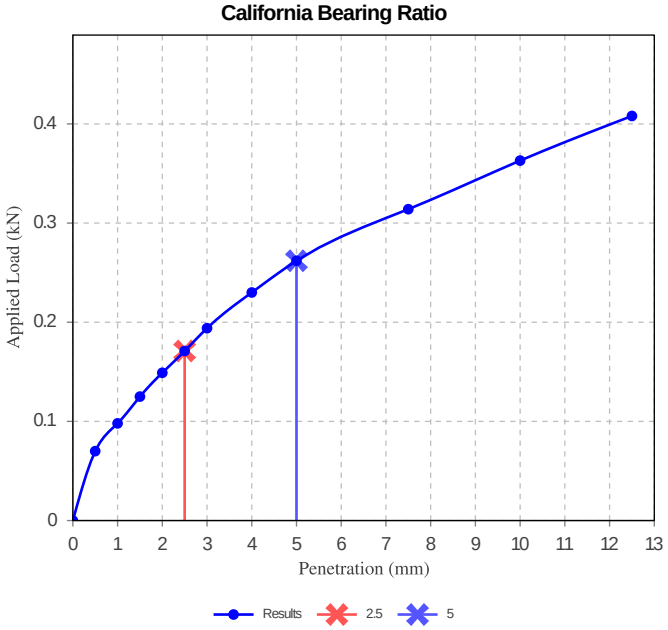
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Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
9.5 mm	**100**		
4.75 mm	**97**		
2.36 mm	**94**		
0.425 mm	**84**		
0.075 mm	**69**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	84		
Liquid Limit (%)	51		
Plastic Limit (%)	18		
Plasticity Index (%)	**33**		
Weighted Plasticity Index (%)	2786		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	16.5		
Cracking Crumbling Curling	Cracking & Curling		





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Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309E
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-105 E: 309640.2, N: 6993329.8**

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**1.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.52		
Optimum Moisture Content (%)	16.5		
Laboratory Density Ratio (%)	94.5		
Laboratory Moisture Ratio (%)	99.5		
Dry Density after Soaking (t/m^3)	1.36		
Field Moisture Content (%)	13.7		
Moisture Content at Placement (%)	16.5		
Moisture Content Top 30mm (%)	30.9		
Moisture Content Rest of Sample (%)	29.3		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	211.8		
Swell (%)	6.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

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Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309F
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-106 E: 305927.6, N: 6997636.9**

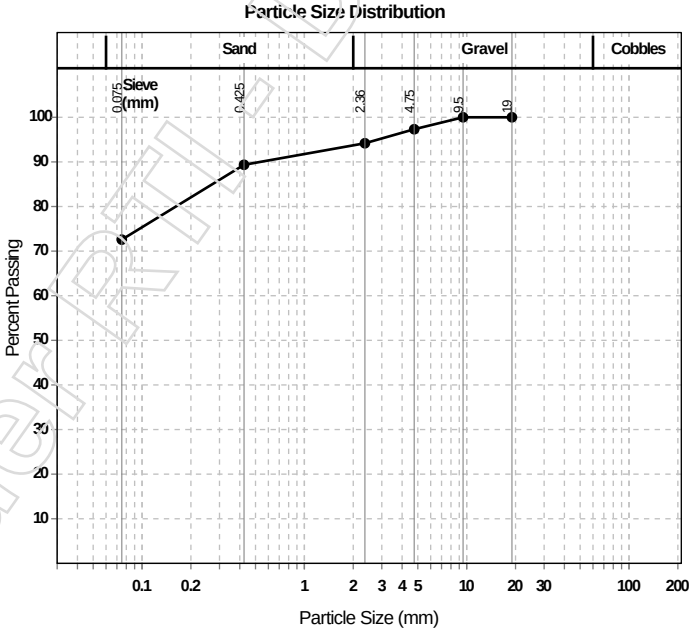
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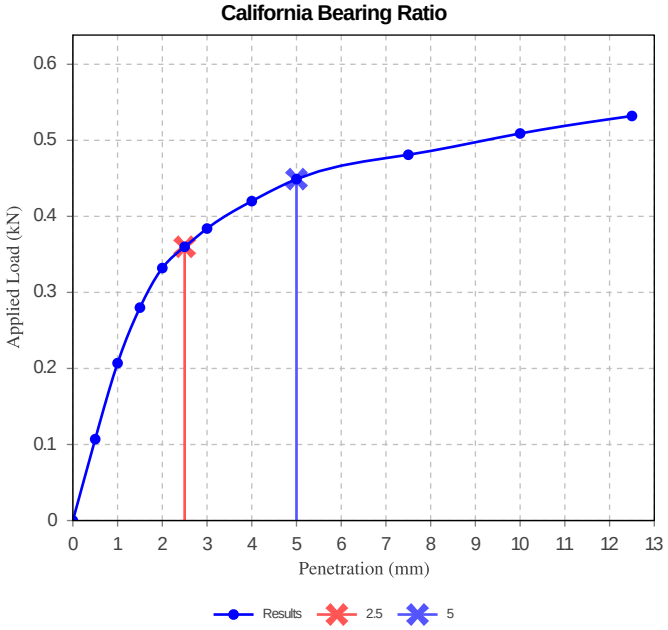
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Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
9.5 mm	**100**		
4.75 mm	**97**		
2.36 mm	**94**		
0.425 mm	**89**		
0.075 mm	**73**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	89		
Liquid Limit (%)	51		
Plastic Limit (%)	18		
Plasticity Index (%)	**33**		
Weighted Plasticity Index (%)	2948		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	17.0		
Cracking Crumbling Curling	Cracking & Curling		





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Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
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Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309F
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-106 E: 305927.6, N: 6997636.9**

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.67		
Optimum Moisture Content (%)	21.0		
Laboratory Density Ratio (%)	95.5		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.54		
Field Moisture Content (%)	17.1		
Moisture Content at Placement (%)	21.1		
Moisture Content Top 30mm (%)	29.7		
Moisture Content Rest of Sample (%)	21.2		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	212.2		
Swell (%)	3.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

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Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309G
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-107 E: 305605.9, N: 6998068.7**

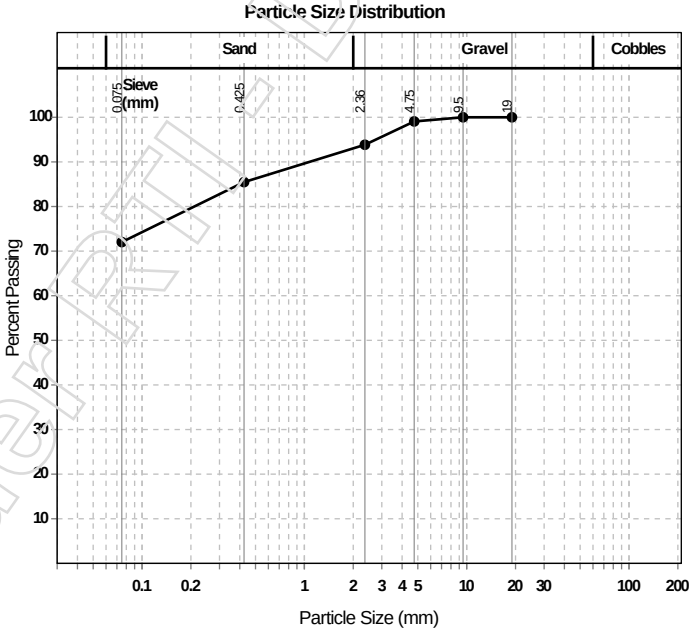
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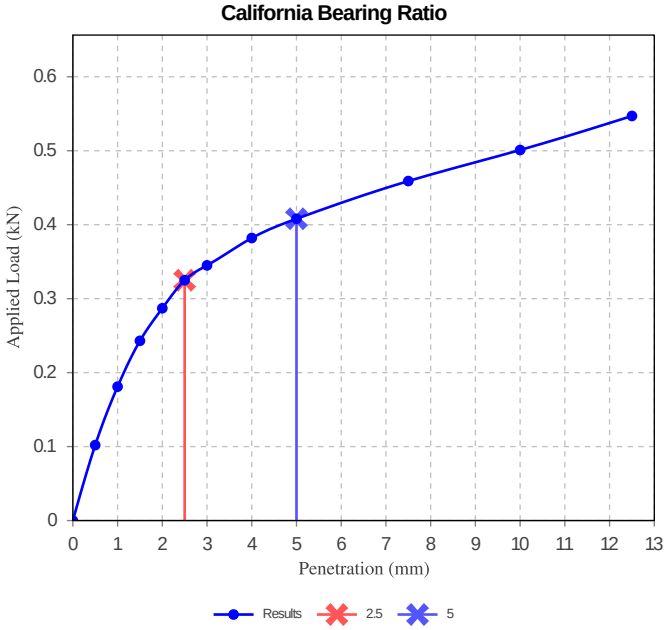
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Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
9.5 mm	**100**		
4.75 mm	**99**		
2.36 mm	**94**		
0.425 mm	**85**		
0.075 mm	**72**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	85		
Liquid Limit (%)	54		
Plastic Limit (%)	20		
Plasticity Index (%)	**34**		
Weighted Plasticity Index (%)	2906		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	17.0		
Cracking Crumbling Curling	Cracking & Curling		





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Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309G
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-107 E: 305605.9, N: 6998068.7**

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.60		
Optimum Moisture Content (%)	20.5		
Laboratory Density Ratio (%)	95.0		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.45		
Field Moisture Content (%)	17.1		
Moisture Content at Placement (%)	20.3		
Moisture Content Top 30mm (%)	31.8		
Moisture Content Rest of Sample (%)	21.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	212		
Swell (%)	4.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

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Material Test Report

Report Number: P21054-1
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309H
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-108 E: 304982.0, N: 6998930.8**

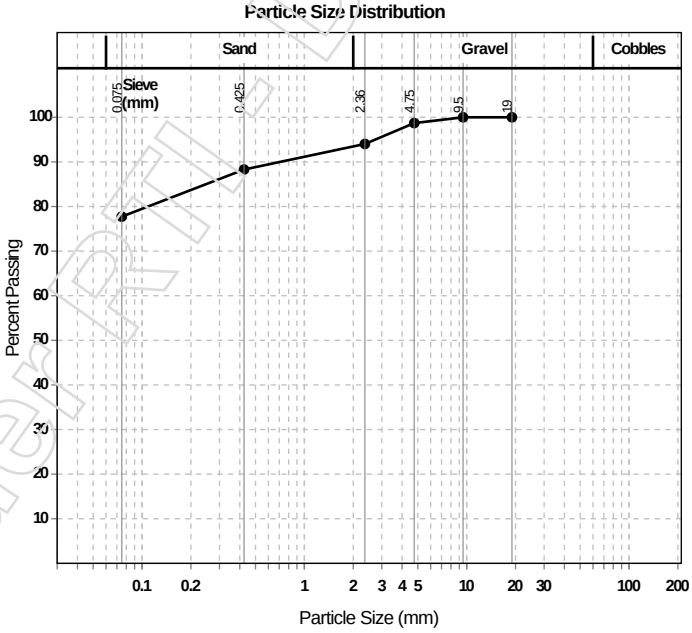
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Western Downs Laboratory
14 Sandalwood Avenue West Dalby Qld 4405
Phone NR
Email NR @ctqs.com.au

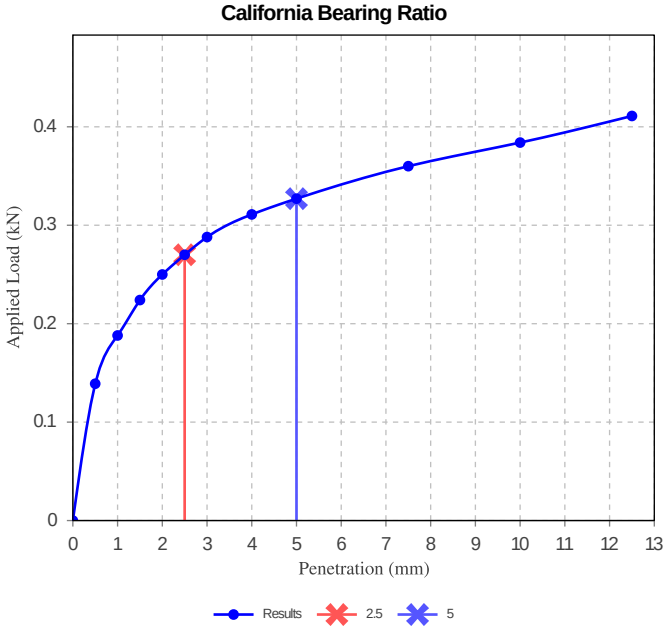
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Approved Signatory: NR
Manager of Technical Services
NATA Accredited Laboratory Number: NR

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
19 mm	**100**			0		
9.5 mm	**100**			0		
4.75 mm	**99**			1		
2.36 mm	**94**			5		
0.425 mm	**88**			6		
0.075 mm	**78**			11		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	88		
Liquid Limit (%)	56		
Plastic Limit (%)	19		
Plasticity Index (%)	**37**		
Weighted Plasticity Index (%)	3267		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	19.0		
Cracking Crumbling Curling	Cracking & Curling		





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Material Test Report

Western Downs Laboratory
14 Sandalwood Avenue West Dalby Qld 4405
Phone NR
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NR

Approved Signatory: NR
Manager of Technical Services
NATA Accredited Laboratory Number: NR

Report Number: **P21054-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309H
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-108 E: 304982.0, N: 6998930.8**

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.0**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.64		
Optimum Moisture Content (%)	21.5		
Laboratory Density Ratio (%)	95.0		
Laboratory Moisture Ratio (%)	100.5		
Dry Density after Soaking (t/m^3)	1.50		
Field Moisture Content (%)	18.5		
Moisture Content at Placement (%)	21.6		
Moisture Content Top 30mm (%)	32.2		
Moisture Content Rest of Sample (%)	22.0		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	210.2		
Swell (%)	4.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

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Material Test Report

Report Number: P21054-1
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Sample Number: S-309I
Date Sampled: 10/03/2021
Dates Tested: 10/03/2021 - 18/03/2021
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Sample Location: **BH-109 E: 304678.2, N: 6999339.9**

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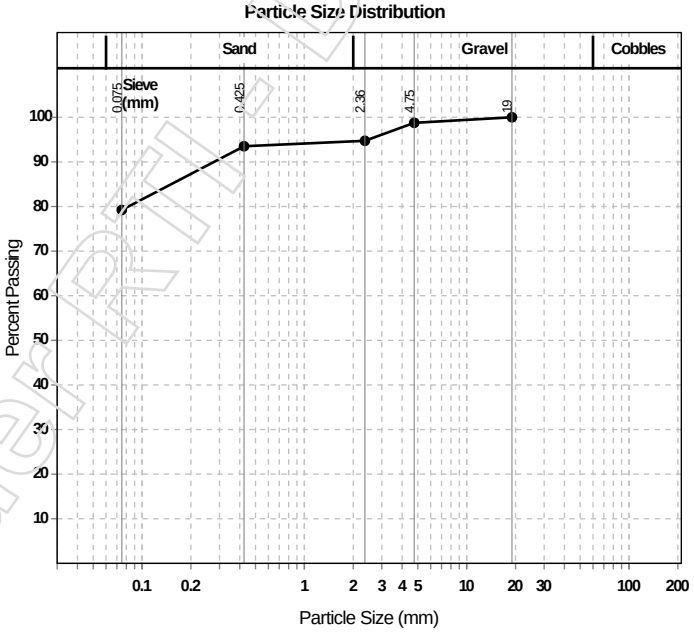
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Approved Signatory: NR
Manager of Technical Services
NATA Accredited Laboratory Number: NR

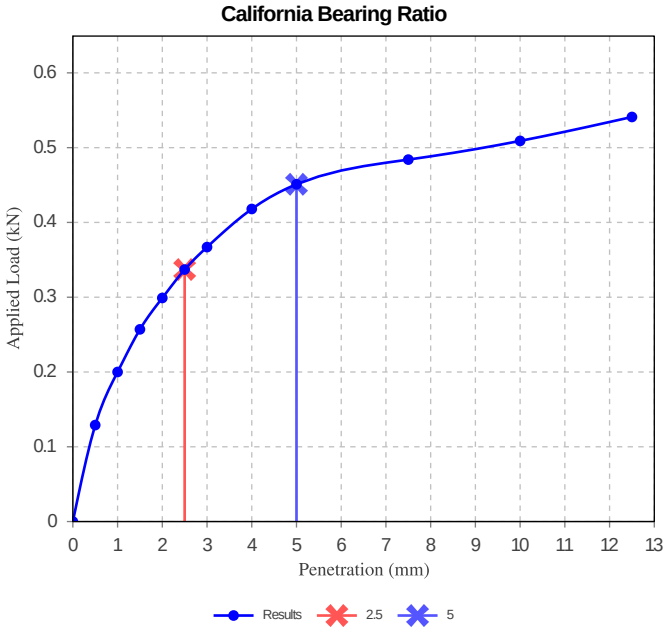
Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
4.75 mm	**99**		
2.36 mm	**95**		
0.425 mm	**94**		
0.075 mm	**79**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	94		
Liquid Limit (%)	58		
Plastic Limit (%)	20		
Plasticity Index (%)	**38**		
Weighted Plasticity Index (%)	3553		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.9.2		
Linear Shrinkage (%)	19.0		
Cracking Crumbling Curling	Cracking & Curling		

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**2.5**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289.3.9.2		
Maximum Dry Density (t/m^3)	1.65		
Optimum Moisture Content (%)	19.0		
Laboratory Density Ratio (%)	95.5		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.49		
Field Moisture Content (%)	17.1		
Moisture Content at Placement (%)	19.2		
Moisture Content Top 30mm (%)	28.3		
Moisture Content Rest of Sample (%)	22.1		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	210		
Swell (%)	5.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			





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Material Test Report

Report Number: **P21054-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project Number: P21054
Project Name: Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Dates Tested: 10/03/2021 - 10/03/2021
Location: Daandine Nandi Road

CTQS Construction Testing & Quality Services
Western Downs Laboratory
14 Sandalwood Avenue West Dalby Qld 4405
Phone: NR
Email: NR@ctqs.com.au

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Approved Signatory: NR
Manager of Technical Services
NATA Accredited Laboratory Number: NR

Moisture Content AS 1289 2.1.1			
Sample Number	Sample Location	Moisture Content (%)	Material
S-309A	BH-101 E: 311396.5, N: 6992312.5	16.0 %	**
S-309B	BH-102 E: 310957.7, N: 6992581.6	11.8 %	**
S-309C	BH-103 E: 310523.1, N: 6992830.4	13.7 %	**
S-309D	BH-104 E: 310075.2, N: 6993081.2	14.3 %	**
S-309E	BH-105 E: 309640.2, N: 6993329.8	13.7 %	**
S-309F	BH-106 E: 305927.6, N: 6997636.9	17.1 %	**
S-309G	BH-107 E: 305605.9, N: 6998068.7	17.1 %	**
S-309H	BH-108 E: 304982.0, N: 6998930.8	18.5 %	**
S-309I	BH-109 E: 304678.2, N: 6999339.9	17.1 %	**

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Material Test Report

Report Number: P21054-1
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project: P21054 - Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Location: Daandine Nandi Road

CTQS Construction Testing & Quality Services
Western Downs Laboratory
14 Sandalwood Avenue West Dalby Qld 4405
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Approved Signatory: NR
Manager of Technical Services
NATA Accredited Laboratory Number: NR

Dynamic Cone Penetrometer AS 1289 6.3.2					
Sample Number	S-309J	S-309K	S-309L	S-309M	S-309N
Location	BH-101	BH-102	BH-103	BH-104	BH-105
Easting	311396.5	310957.7	310523.1	310075.2	309640.2
Northing	6992312.5	6992581.6	6992830.4	6993081.2	6993329.8
Date Tested	10/03/2021	10/03/2021	10/03/2021	10/03/2021	10/03/2021
Soil Description	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Silty Clay
Reduced Level (mm)					
Moisture Condition	Moist	Moist	Moist	Moist	Moist
Start Depth (mm)	Subgrade Level	Subgrade Level	Subgrade Level	Subgrade Level	Subgrade Level
0-100 blows/100 mm	6	5	7	6	5
100-200 blows/100 mm	8	4	7	5	4
200-300 blows/100 mm	7	7	7	6	5
300-400 blows/100 mm	7	6	6	6	6
400-500 blows/100 mm	7	6	6	8	6
500-600 blows/100 mm	6	8	5	7	9
600-700 blows/100 mm	5	7	8	8	8
700-800 blows/100 mm	8	9	7	6	7
800-900 blows/100 mm	9	9	6	6	7
900-1000 blows/100 mm	8	7	6	8	8
1000-1100 blows/100 mm	7	8	8	7	8
1100-1200 blows/100 mm	8	8	8	6	7
1200-1300 blows/100 mm	10	8	8	6	7
1300-1400 blows/100 mm	10	9	9	9	8
1400-1500 blows/100 mm	9	10	9	7	10
Ground Water Level					
Remarks					

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Material Test Report

Report Number: P21054-1
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Add addition information*
Date Issued: 12/04/2021
Client: MJ Smith Ground Preparation Pty Ltd
Commodity Court, Dalby QLD 4405
Contact: NR
Project: P21054 - Daandine Nandi Pavement Investigation
Project Location: Daandine Nandi Road
Work Request: 309
Location: Daandine Nandi Road

CTQS Construction Testing & Quality Services
Western Downs Laboratory
14 Sandalwood Avenue West Dalby Qld 4405
Phone: NR
Email: NR @ctqs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing
NR
Approved Signatory: NR
Manager of Technical Services
NATA Accredited Laboratory Number: NR

Dynamic Cone Penetrometer AS 1289 6.3.2					
Sample Number	S-309O	S-309P	S-309Q	S-309R	
Location	BH-106	BH-107	BH-108	BH-109	
Easting	305927.6	305605.9	304982.0	304678.2	
Northing	6997636.9	6998068.7	6998930.8	6999339.9	
Date Tested	10/03/2021	10/03/2021	10/03/2021	10/03/2021	
Soil Description	Silty Clay	Silty Clay	Silty Clay	Silty Clay	
Reduced Level (mm)					
Moisture Condition	Moist	Moist	Moist	Moist	
Start Depth (mm)	Subgrade Level	Subgrade Level	Subgrade Level	Subgrade Level	
0-100 blows/100 mm	6	7	5	6	
100-200 blows/100 mm	6	5	5	5	
200-300 blows/100 mm	6	5	6	5	
300-400 blows/100 mm	9	7	5	7	
400-500 blows/100 mm	7	8	8	8	
500-600 blows/100 mm	7	8	7	8	
600-700 blows/100 mm	6	8	7	6	
700-800 blows/100 mm	8	7	8	7	
800-900 blows/100 mm	8	6	9	6	
900-1000 blows/100 mm	7	9	10	9	
1000-1100 blows/100 mm	7	9	8	8	
1100-1200 blows/100 mm	5	10	9	10	
1200-1300 blows/100 mm	6	11	9	12	
1300-1400 blows/100 mm	7	10	11	9	
1400-1500 blows/100 mm	8	10	12	11	
Ground Water Level					
Remarks					

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Results relate only to the items tested/sampled.

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4816**
Issue No:	**1**

Sample Details

Sample Number:	4323
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.5**			
	Achieved Compaction - Dry Density (t/m3)	**1.70**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	0.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.69**			
	Achieved Compacted Dry Density (t/m3)	**1.70**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**18.9**			
	Achieved Compaction Moisture Content (%)	**18.5**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type	**Standard**			

Specimen Number	1	2	3
Dry Density (t/m3)	1.70	1.70	1.71
Specimen Capped	No	No	No
UCS Results (Mpa)	0.4	0.4	0.4
Mean UCS (MPa)	**0.4**		

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Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4817**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
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Sample Details

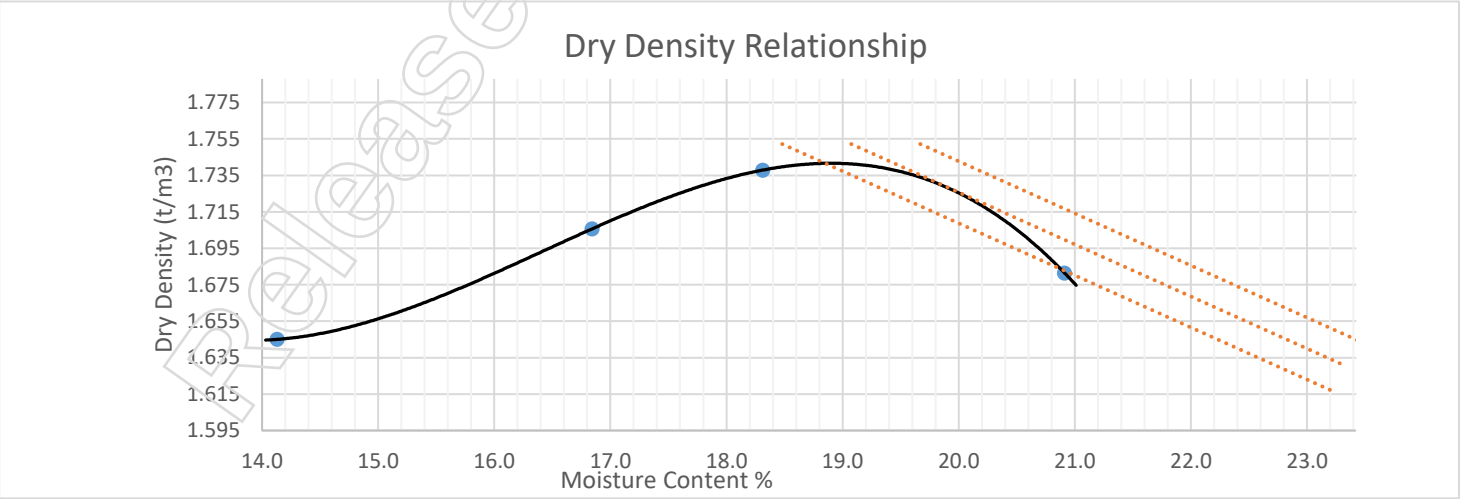
Sample Number:	4323
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.74**			
	Optimum Moisture Content (%)	**19.0**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	96			



Comments:

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Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4818
Issue No: 1

Sample Details

Sample Number:	4324
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.0**			
	Achieved Compaction - Dry Density (t/m3)	**1.67**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	2.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.68**			
	Achieved Compacted Dry Density (t/m3)	**1.67**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**18.1**			
	Achieved Compaction Moisture Content (%)	**18**			
	Achieved Percentage of OMC (%)	**99**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.68 1.67 1.67			
	Specimen Capped	No No No			
	UCS Results (Mpa)	0.9 0.8 0.6			
	Mean UCS (MPa)	**0.8**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4819**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
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Sample Details

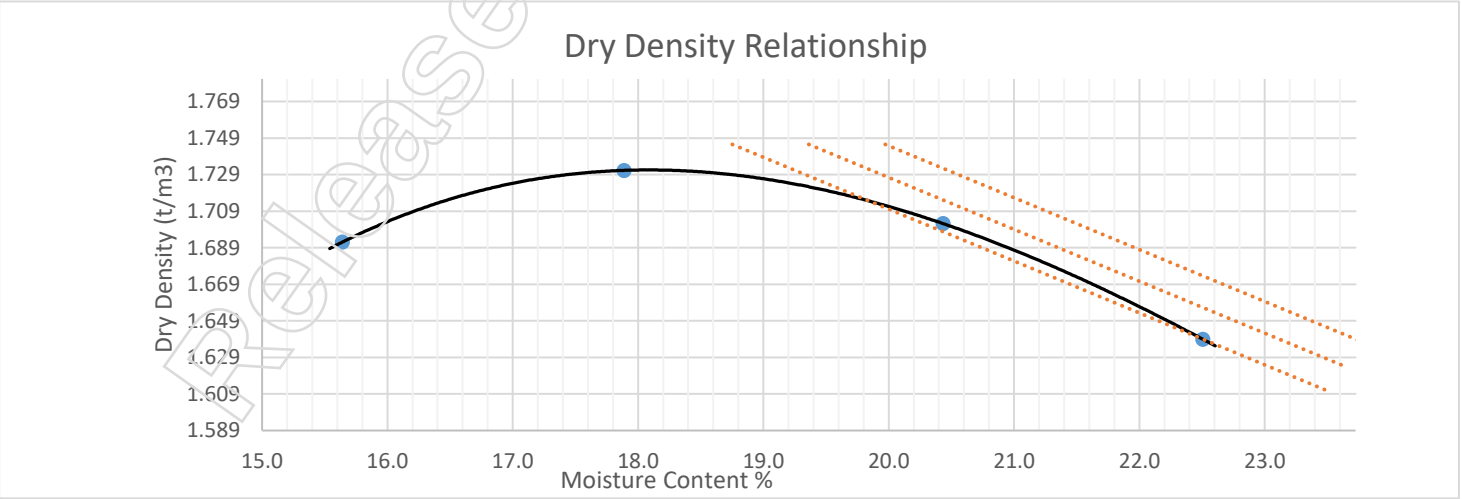
Sample Number:	4324
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.73**			
	Optimum Moisture Content (%)	**18.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**2.0**			



Comments:

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Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4820
Issue No: 1

Sample Details

Sample Number:	4325
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
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Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.4**			
	Achieved Compaction - Dry Density (t/m3)	**1.64**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	4.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.64**			
	Achieved Compacted Dry Density (t/m3)	**1.64**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**18.5**			
	Achieved Compaction Moisture Content (%)	**18.4**			
	Achieved Percentage of OMC (%)	**99**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.65 1.64 1.64			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.1 1.7 2.0			
	Mean UCS (MPa)	**1.9**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4821**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Sample Details

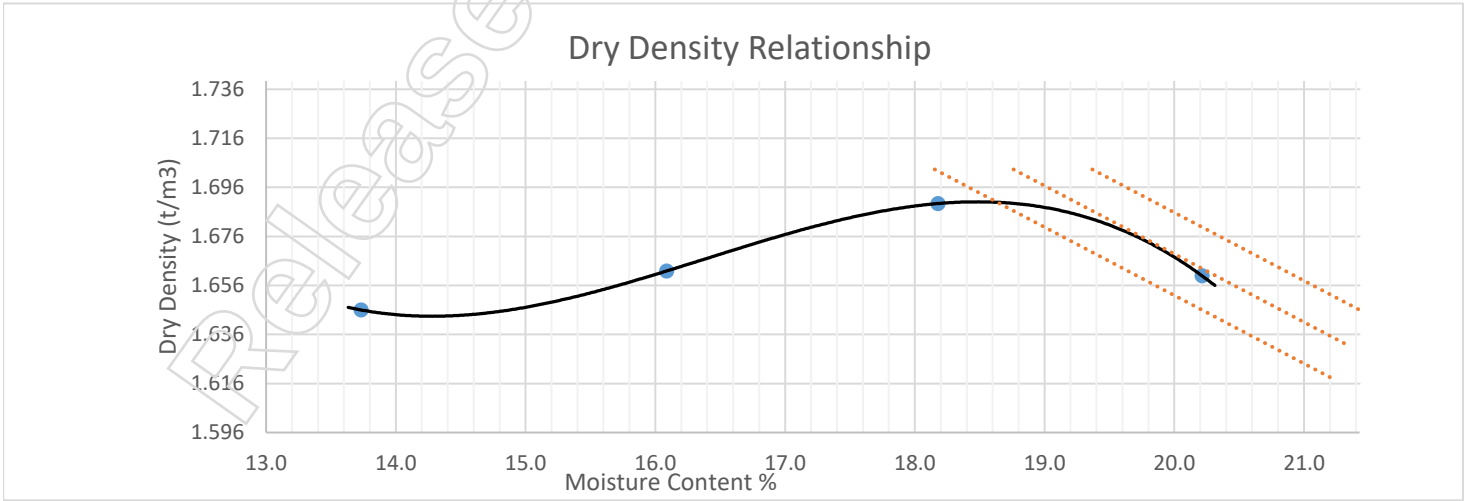
Sample Number:	4325
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.69**			
	Optimum Moisture Content (%)	**18.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**4.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4822
Issue No: 1

Sample Details

Sample Number:	4326
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:
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Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.3**			
	Achieved Compaction - Dry Density (t/m3)	**1.61**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	6.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.61**			
	Achieved Compacted Dry Density (t/m3)	**1.61**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**18.2**			
	Achieved Compaction Moisture Content (%)	**18.3**			
	Achieved Percentage of OMC (%)	**101**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.61 1.61 1.61			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.8 1.7 1.6			
	Mean UCS (MPa)	**1.7**			

Released under NATA

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4823**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

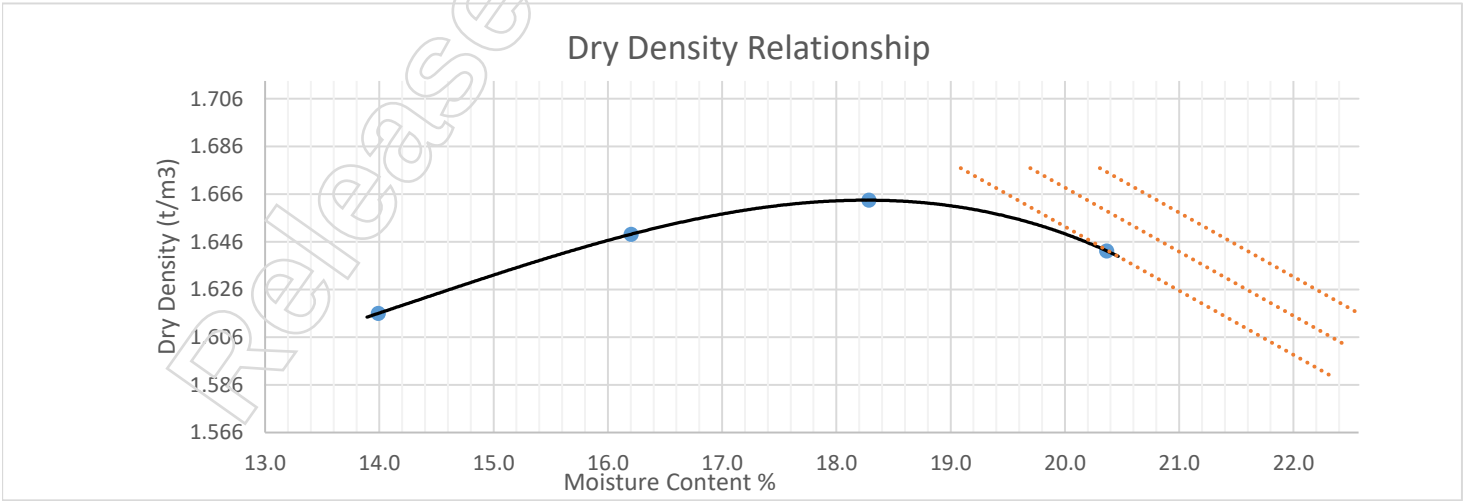
Sample Number:	4326
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.66**			
	Optimum Moisture Content (%)	**18.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**6.0**			



Comments:

Released under RTIA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4824
Issue No: 1

Sample Details

Sample Number:	4327
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.8**			
	Achieved Compaction - Dry Density (t/m3)			**1.61**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			8.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.61**			
	Achieved Compacted Dry Density (t/m3)			**1.61**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**18.8**			
	Achieved Compaction Moisture Content (%)			**18.8**			
	Achieved Percentage of OMC (%)			**100**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.61	1.61	1.61			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	2.1	2.0	2.0			
	Mean UCS (MPa)			**2.0**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4825**
Issue No:	**1**

NATA Accredited Laboratory Numbe NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

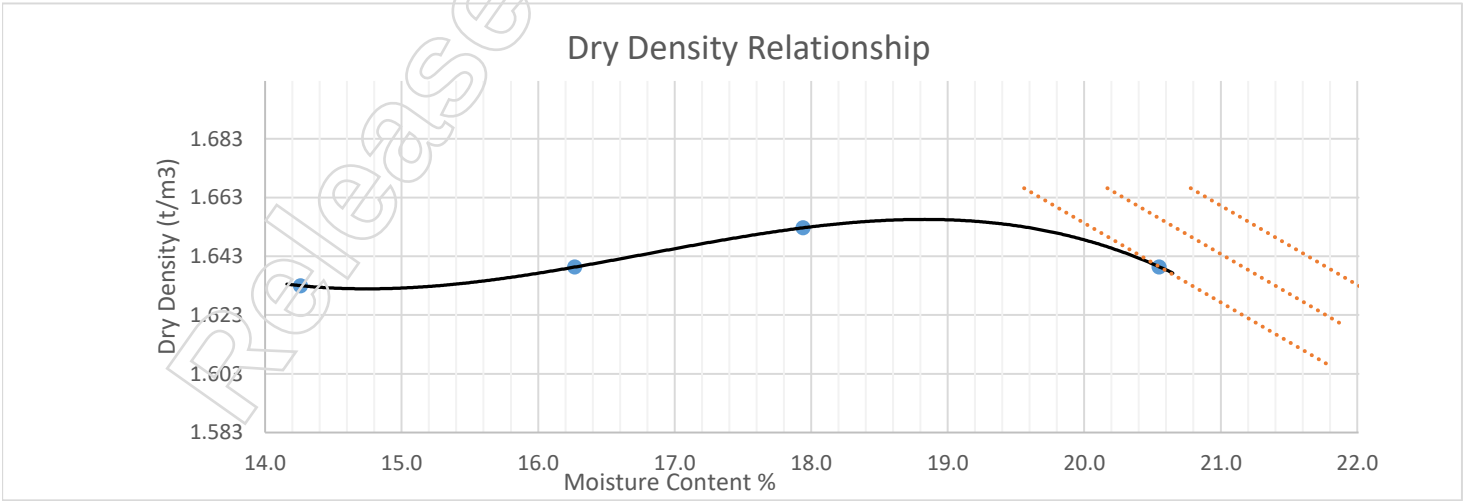
Sample Number:	4327
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.66**			
	Optimum Moisture Content (%)	**19.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**8.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4826**
Issue No:	**1**

Sample Details

Sample Number:	4328
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 5/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:

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Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**16.1**			
	Achieved Compaction - Dry Density (t/m3)			**1.76**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			0.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.76**			
	Achieved Compacted Dry Density (t/m3)			**1.76**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**16.4**			
	Achieved Compaction Moisture Content (%)			**16.1**			
	Achieved Percentage of OMC (%)			**98**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.76	1.75	1.77			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.5	0.4	0.4			
	Mean UCS (MPa)			**0.4**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4827**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

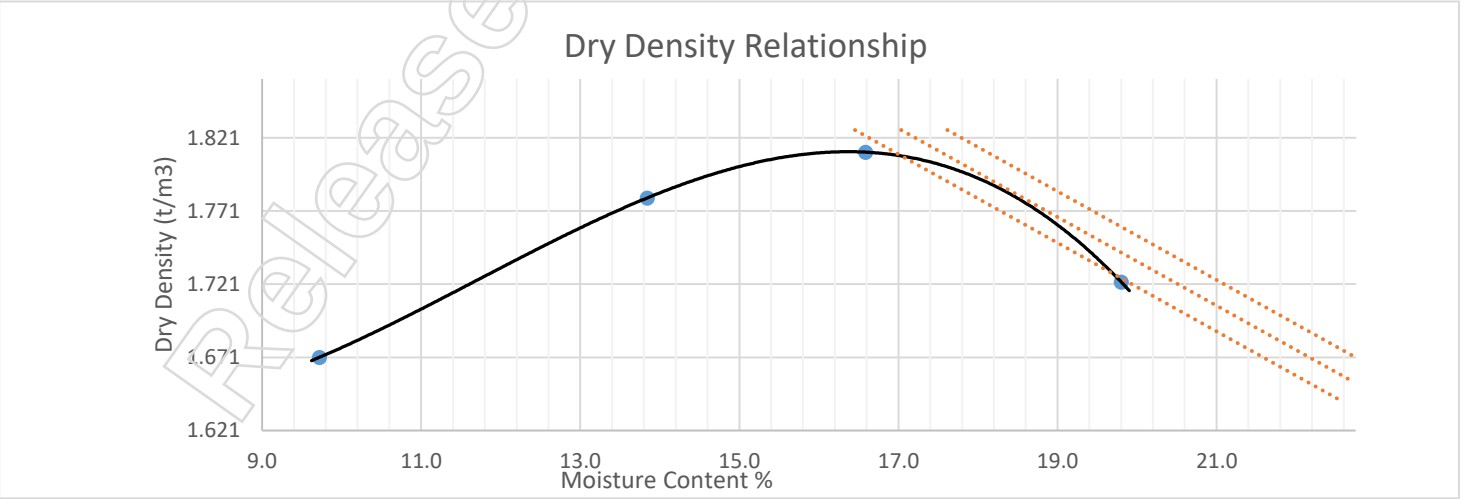
Sample Number:	4328
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.81**			
	Optimum Moisture Content (%)	**16.5**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	75			



Comments:

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Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR@superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4828
Issue No: 1

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4329
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**15.9**			
	Achieved Compaction - Dry Density (t/m3)	**1.71**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	1.5			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.7**			
	Achieved Compacted Dry Density (t/m3)	**1.71**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**16.3**			
	Achieved Compaction Moisture Content (%)	**15.9**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.70 1.72 1.70			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.1 1.1 1.1			
	Mean UCS (MPa)	**1.1**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4829**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

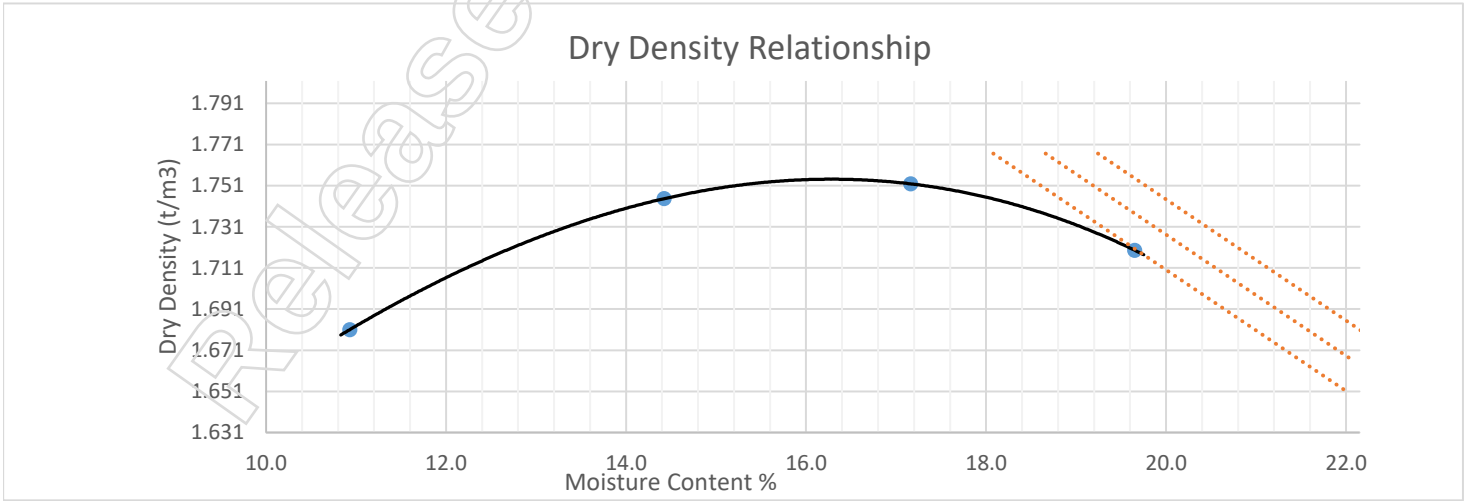
Sample Number:	4329
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.75**			
	Optimum Moisture Content (%)	**16.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**1.5**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4830
Issue No: 1

Sample Details

Sample Number:	4330
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**16.7**			
	Achieved Compaction - Dry Density (t/m3)			**1.68**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			3.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.67**			
	Achieved Compacted Dry Density (t/m3)			**1.68**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**17.0**			
	Achieved Compaction Moisture Content (%)			**16.7**			
	Achieved Percentage of OMC (%)			**98**			
	Compaction Type						
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.68	1.67	1.68			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.8	1.6	1.8			
	Mean UCS (MPa)			**1.7**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
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Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4831**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

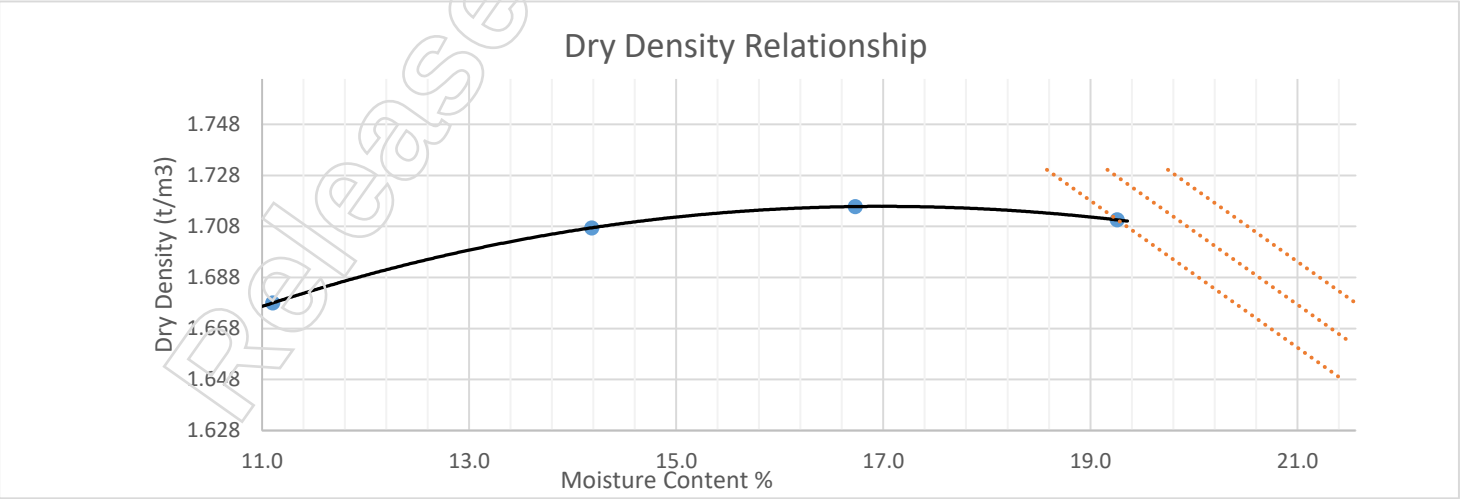
Sample Number:	4330
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.72**			
	Optimum Moisture Content (%)	**17.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**3.5**			



Released under RTA DTMR

Comments:

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: @superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4832
Issue No: 1

Sample Details

Sample Number:	4331
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**16.8**			
	Achieved Compaction - Dry Density (t/m3)			**1.66**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.65**			
	Achieved Compacted Dry Density (t/m3)			**1.66**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**17.1**			
	Achieved Compaction Moisture Content (%)			**16.8**			
	Achieved Percentage of OMC (%)			**98**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.66	1.65	1.65			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	2.0	1.8	1.9			
	Mean UCS (MPa)			**1.9**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4833**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Sample Details

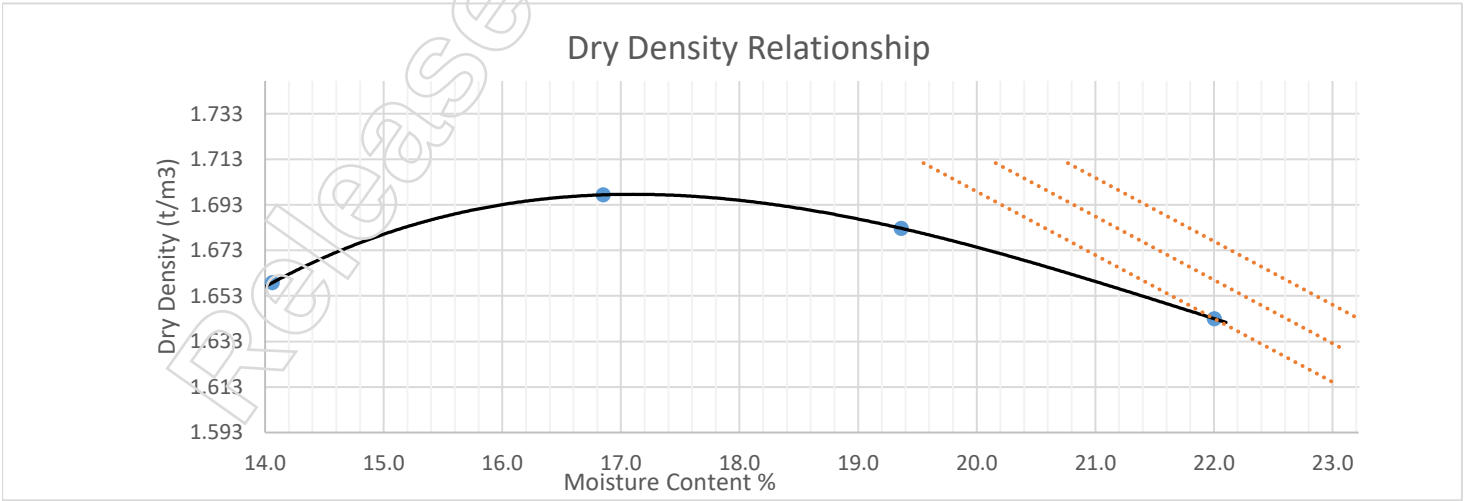
Sample Number:	4331
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.70**			
	Optimum Moisture Content (%)	**17.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**5.5**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4834
Issue No: 1

Sample Details

Sample Number:	4332
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**16.8**			
	Achieved Compaction - Dry Density (t/m3)			**1.65**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			7.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.64**			
	Achieved Compacted Dry Density (t/m3)			**1.65**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**17.0**			
	Achieved Compaction Moisture Content (%)			**16.8**			
	Achieved Percentage of OMC (%)			**99**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.65	1.65	1.65			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.9	1.7	1.8			
	Mean UCS (MPa)			**1.8**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4835**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

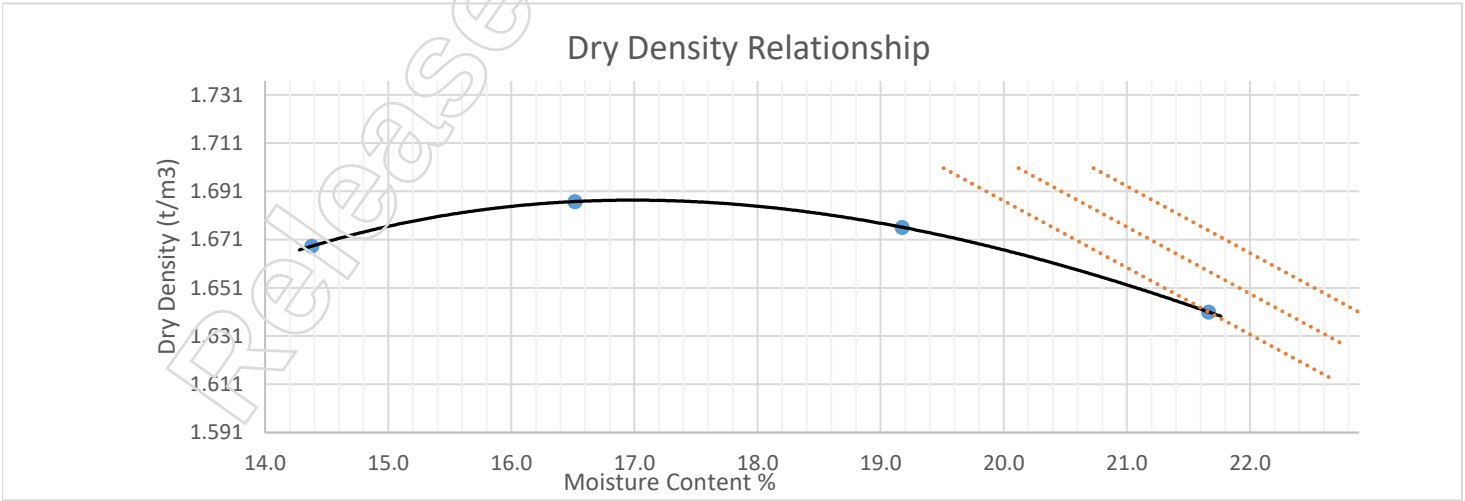
Sample Number:	4332
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.69**			
	Optimum Moisture Content (%)	**17.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.5**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4836**
Issue No:	**1**

Sample Details

Sample Number:	4333
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**17.3**			
	Achieved Compaction - Dry Density (t/m3)	**1.73**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	0.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.73**			
	Achieved Compacted Dry Density (t/m3)	**1.73**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**17.8**			
	Achieved Compaction Moisture Content (%)	**17.3**			
	Achieved Percentage of OMC (%)	**97**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.73 1.73 1.73			
	Specimen Capped	No No No			
	UCS Results (Mpa)	0.5 0.4 0.5			
	Mean UCS (MPa)	**0.5**			

Released under NATA D-MR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
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Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4837**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

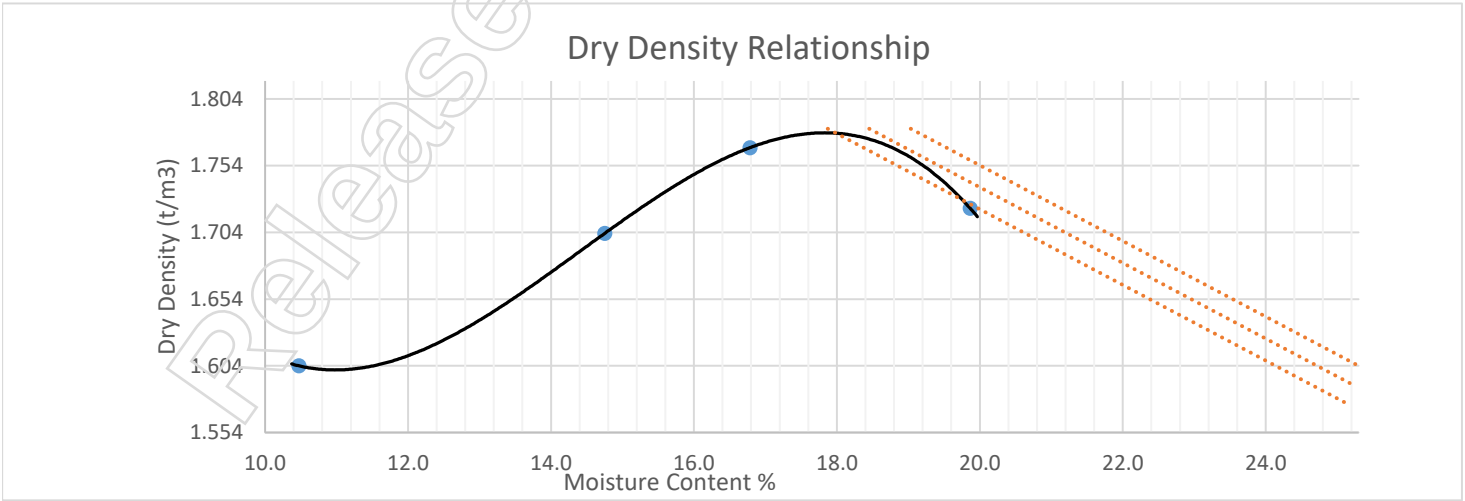
Sample Number:	4333
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.78**			
	Optimum Moisture Content (%)	**18.0**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	50			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
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Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4838
Issue No: 1

Sample Details

Sample Number:	4334
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**17.6**			
	Achieved Compaction - Dry Density (t/m3)			**1.68**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			1.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.67**			
	Achieved Compacted Dry Density (t/m3)			**1.68**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**17.9**			
	Achieved Compaction Moisture Content (%)			**17.6**			
	Achieved Percentage of OMC (%)			**98**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.67	1.68	1.68			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.8	0.7	0.6			
	Mean UCS (MPa)			**0.7**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4839**
Issue No:	**1**

Sample Details

Sample Number:	4334
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

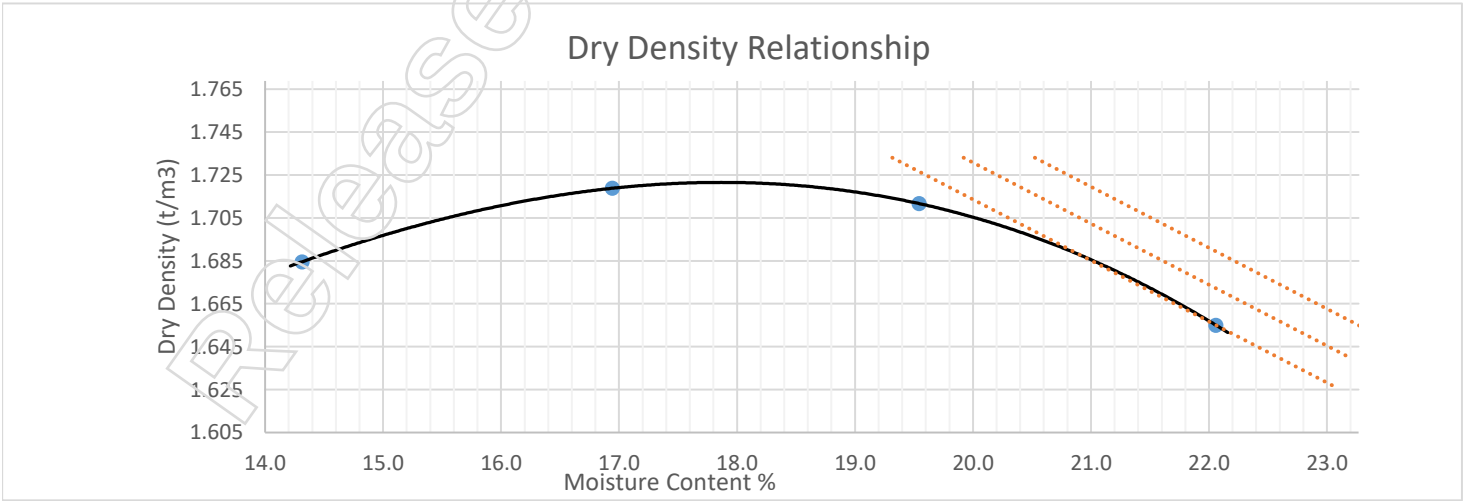
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Report Notes:
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Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.72**			
	Optimum Moisture Content (%)	**18.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**1.5**			



Comments:

Released under RTIA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4840
Issue No: 1

Sample Details

Sample Number:	4335
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**17.4**			
	Achieved Compaction - Dry Density (t/m3)			**1.64**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			3.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.65**			
	Achieved Compacted Dry Density (t/m3)			**1.64**			
	Achieved Relative Compaction (%)			**96.5**			
	Target Compaction Moisture Content (%)			**17.5**			
	Achieved Compaction Moisture Content (%)			**17.4**			
	Achieved Percentage of OMC (%)			**99**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.64	1.65	1.65			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.0	1.0	1.0			
	Mean UCS (MPa)			**1.0**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4841**
Issue No:	**1**

Sample Details

Sample Number:	4335
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR

NR

ACCREDITED FOR TECHNICAL COMPETENCE

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:

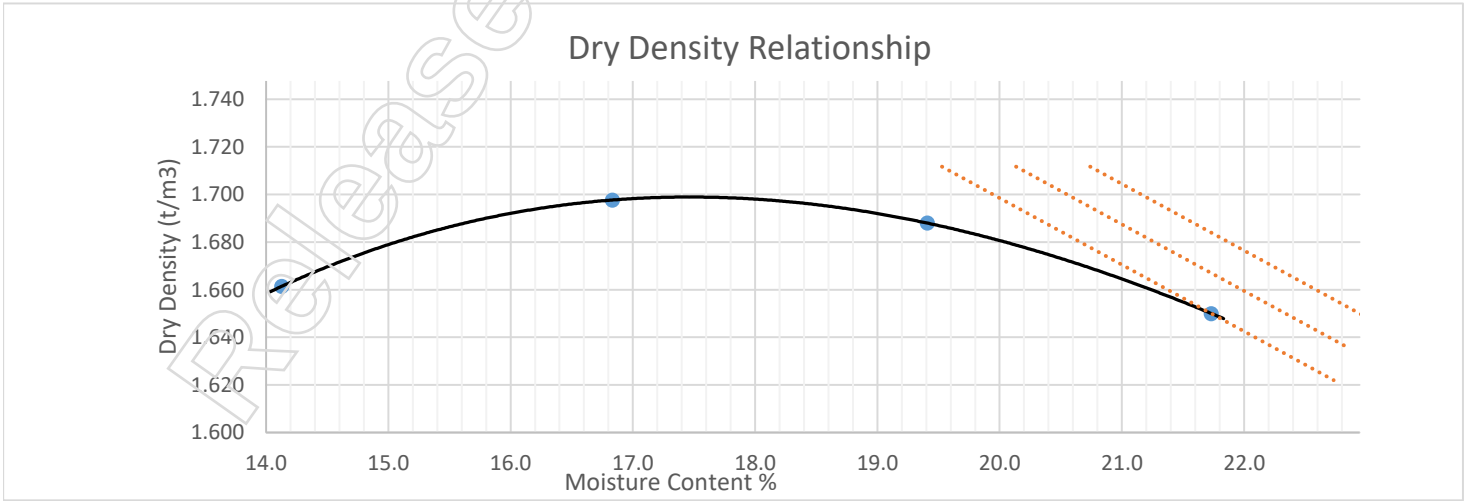
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.70**			
	Optimum Moisture Content (%)	**17.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**3.5**			



Comments:

Released under RTI DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4842
Issue No: 1

Sample Details

Sample Number:	4336
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**19.4**			
	Achieved Compaction - Dry Density (t/m3)			**1.63**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.63**			
	Achieved Compacted Dry Density (t/m3)			**1.63**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**19.3**			
	Achieved Compaction Moisture Content (%)			**19.4**			
	Achieved Percentage of OMC (%)			**101**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.63	1.63	1.62			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	2.1	1.7	1.8			
	Mean UCS (MPa)			**1.9**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4843**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

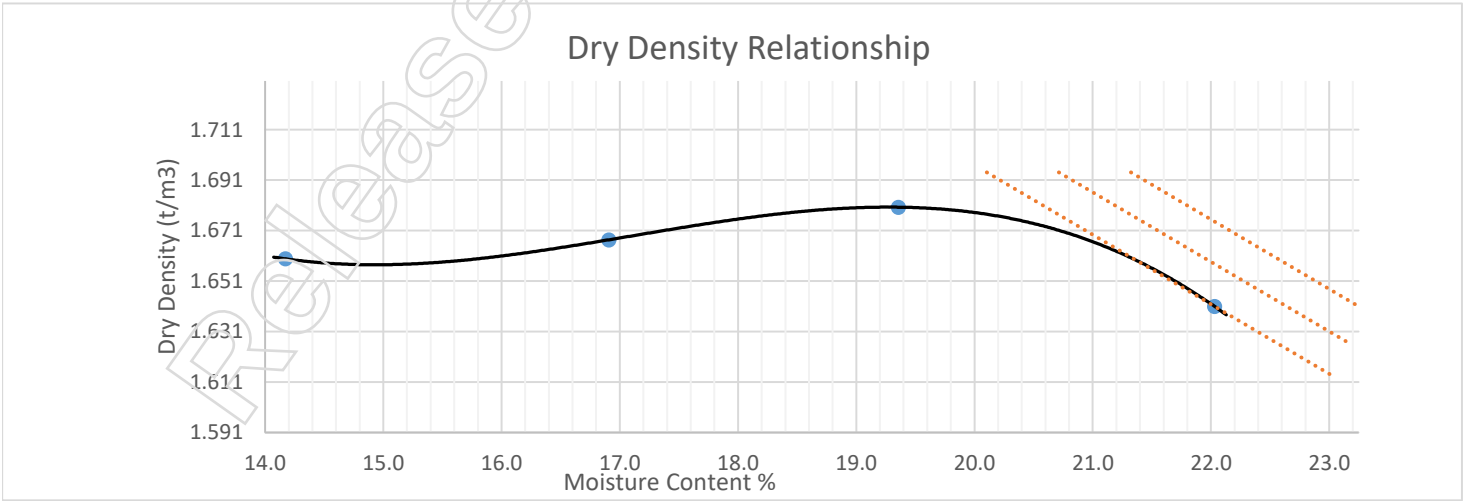
Sample Number:	4336
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.68**			
	Optimum Moisture Content (%)	**19.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**5.5**			



Comments:

Released under RTMR DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4844
Issue No: 1

Sample Details

Sample Number:	4337
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.7**			
	Achieved Compaction - Dry Density (t/m3)			**1.61**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			7.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.61**			
	Achieved Compacted Dry Density (t/m3)			**1.61**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**18.7**			
	Achieved Compaction Moisture Content (%)			**18.7**			
	Achieved Percentage of OMC (%)			**100**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.62	1.61	1.61			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.7	1.4	1.6			
	Mean UCS (MPa)			**1.6**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4845**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

Sample Number:	4337
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

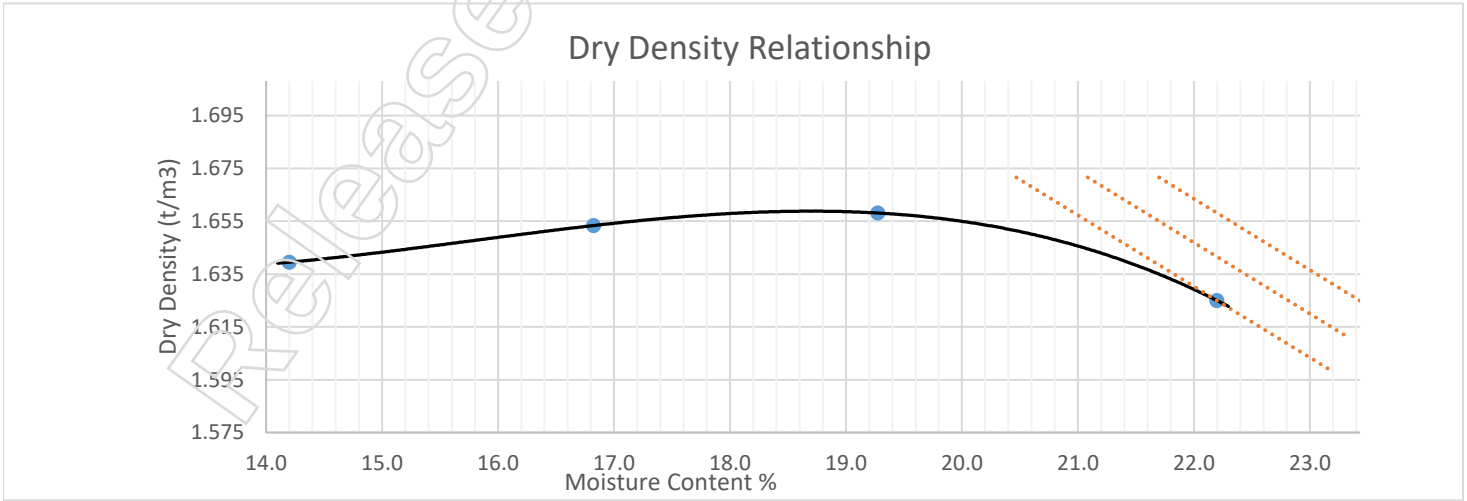
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.66**			
	Optimum Moisture Content (%)	**18.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.5**			



Comments:

Released under RTIA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4846
Issue No: 1

Sample Details

Sample Number:	4338
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**17.0**			
	Achieved Compaction - Dry Density (t/m3)	**1.71**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	0.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.7**			
	Achieved Compacted Dry Density (t/m3)	**1.71**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**17.9**			
	Achieved Compaction Moisture Content (%)	**17**			
	Achieved Percentage of OMC (%)	**95**			
	Compaction Type	**Standard**			

Specimen Number	1	2	3
Dry Density (t/m3)	1.71	1.71	1.71
Specimen Capped	No	No	No
UCS Results (Mpa)	0.5	0.5	0.6
Mean UCS (MPa)	**0.5**		

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4847**
Issue No:	**1**

NATA Accredited Laboratory Numbe NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

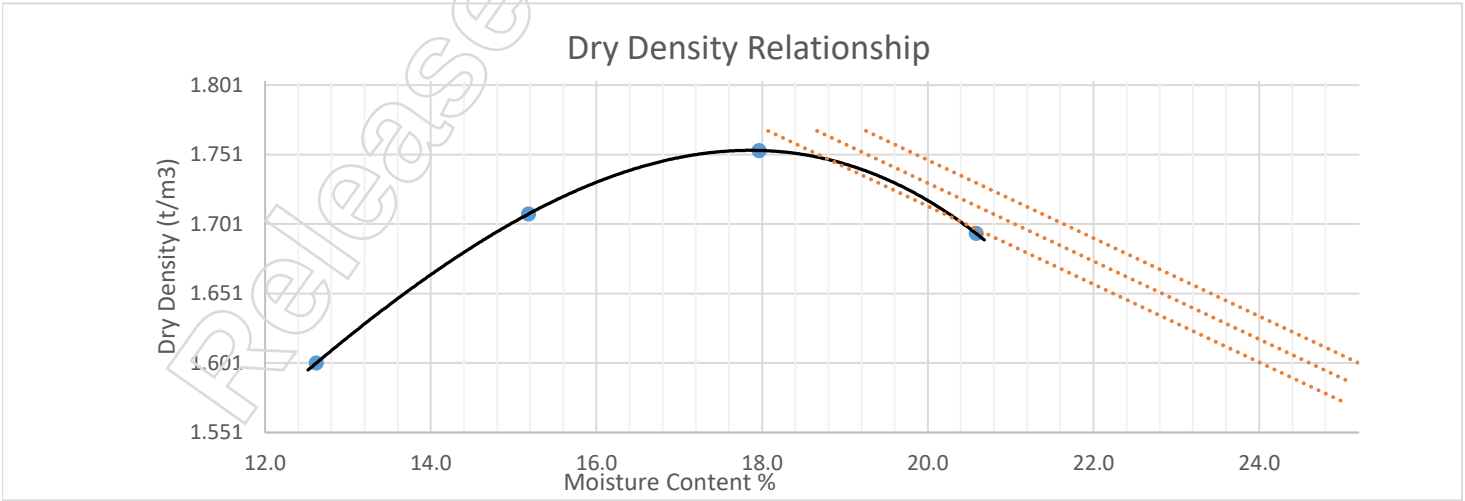
Sample Number:	4338
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.75**			
	Optimum Moisture Content (%)	**18.0**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	49			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4848
Issue No: 1

Sample Details

Sample Number:	4339
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.1**			
	Achieved Compaction - Dry Density (t/m3)			**1.67**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			1.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/-			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.67**			
	Achieved Compacted Dry Density (t/m3)			**1.67**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**18.6**			
	Achieved Compaction Moisture Content (%)			**18.1**			
	Achieved Percentage of OMC (%)			**97**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.67	1.66	1.67			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.4	0.5	0.5			
	Mean UCS (MPa)			**0.5**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4849**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

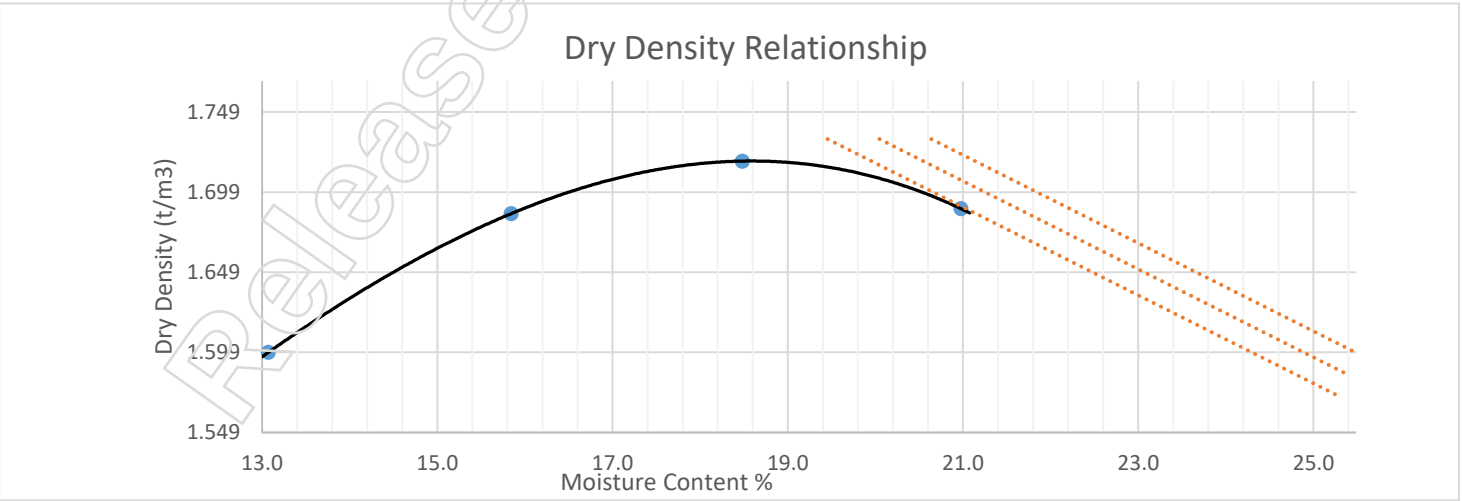
Sample Number:	4339
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.72**			
	Optimum Moisture Content (%)	**18.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.5**			



Released under RTA DTMR

Comments:

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4850
Issue No: 1

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4340
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.3**			
	Achieved Compaction - Dry Density (t/m3)	**1.64**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.63**			
	Achieved Compacted Dry Density (t/m3)	**1.64**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**19.1**			
	Achieved Compaction Moisture Content (%)	**18.3**			
	Achieved Percentage of OMC (%)	**96**			
	Compaction Type	**Standard**			

Specimen Number	1	2	3
Dry Density (t/m3)	1.63	1.63	1.64
Specimen Capped	No	No	No
UCS Results (Mpa)	1.3	1.2	1.2
Mean UCS (MPa)			**1.2**

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4851**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Sample Details

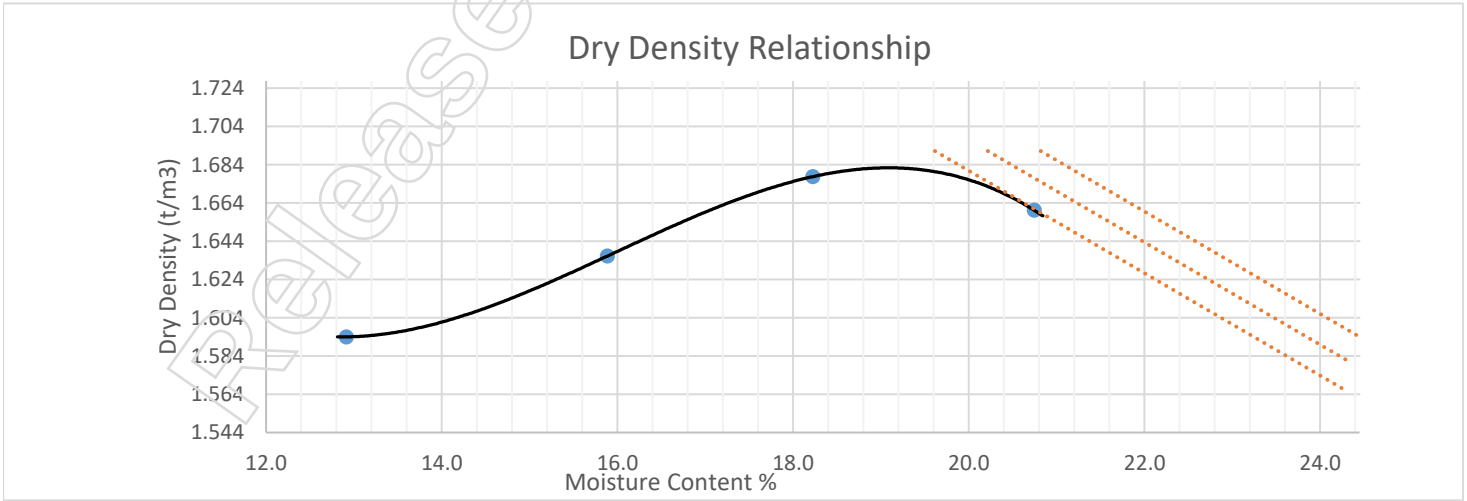
Sample Number:	4340
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.68**			
	Optimum Moisture Content (%)	**19.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**3.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4852
Issue No: 1

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4341
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.0**			
	Achieved Compaction - Dry Density (t/m3)	**1.61**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	5.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.61**			
	Achieved Compacted Dry Density (t/m3)	**1.61**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**18.5**			
	Achieved Compaction Moisture Content (%)	**18**			
	Achieved Percentage of OMC (%)	**97**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.62 1.61 1.62			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.3 0.9 1.5			
	Mean UCS (MPa)	**1.2**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4853**
Issue No:	**1**

NATA Accredited Laboratory Number NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4341
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

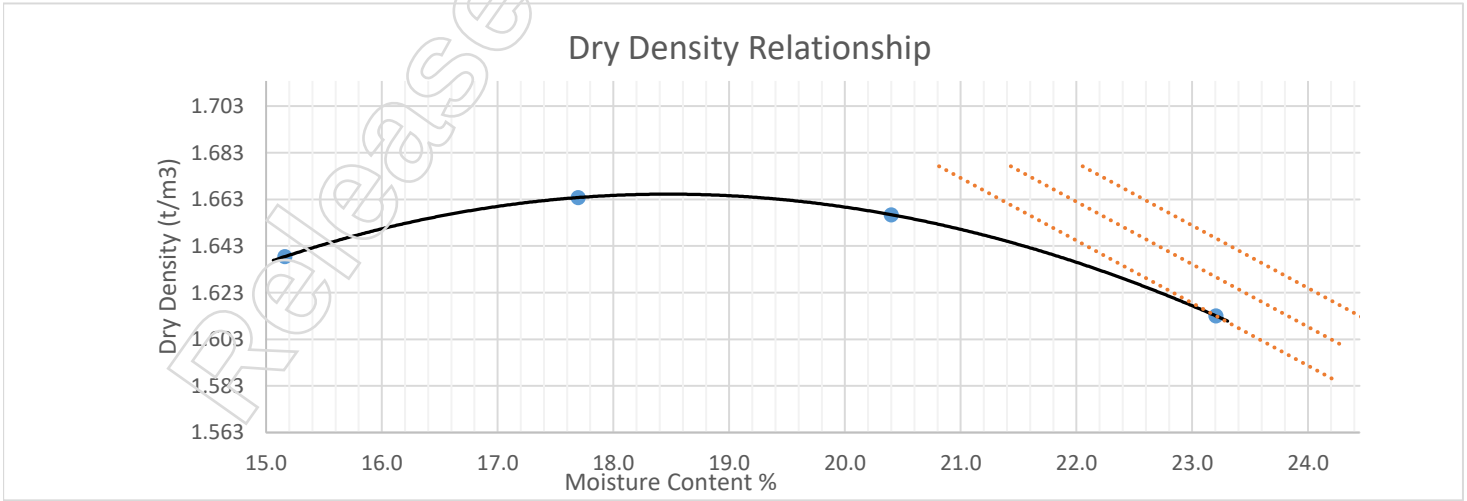
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.66**			
	Optimum Moisture Content (%)	**18.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**5.0**			



Comments:

Released under RTI DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4854
Issue No: 1

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4342
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**19.3**			
	Achieved Compaction - Dry Density (t/m3)	**1.59**			
Q115	Stabilising Agent Source				
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.0			
	ATIC Registration Number				
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.58**			
	Achieved Compacted Dry Density (t/m3)	**1.59**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**19.6**			
	Achieved Compaction Moisture Content (%)	**19.3**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type	**Standard**			

Specimen Number	1	2	3
Dry Density (t/m3)	1.59	1.59	1.59
Specimen Capped	No	No	No
UCS Results (Mpa)	1.9	1.9	1.8
Mean UCS (MPa)	**1.9**		

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4855**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

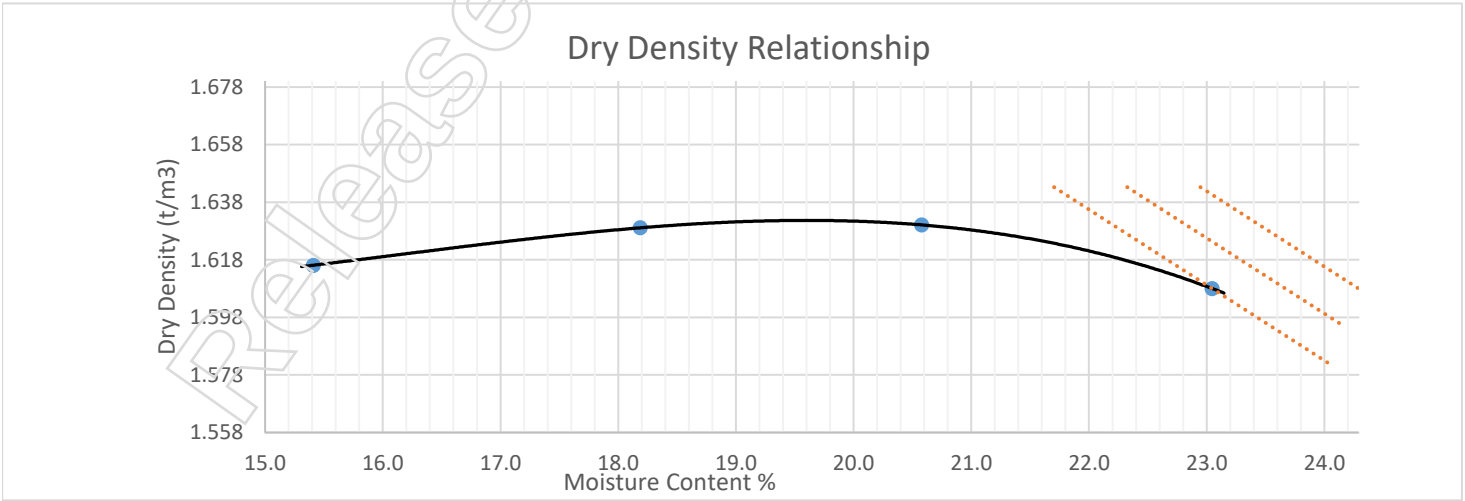
Sample Number:	4342
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.63**			
	Optimum Moisture Content (%)	**19.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.0**			



Comments:

Released under RTA DTMR

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4856**
Issue No:	**1**

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 5/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4343
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.8**			
	Achieved Compaction - Dry Density (t/m3)	**1.65**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	0.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.65**			
	Achieved Compacted Dry Density (t/m3)	**1.65**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**19.5**			
	Achieved Compaction Moisture Content (%)	**18.8**			
	Achieved Percentage of OMC (%)	**96**			
	Compaction Type	**Standard**			

Specimen Number	1	2	3
Dry Density (t/m3)	1.65	1.65	1.66
Specimen Capped	No	No	No
UCS Results (Mpa)	0.5	0.5	0.7
Mean UCS (MPa)	**0.6**		

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4857**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

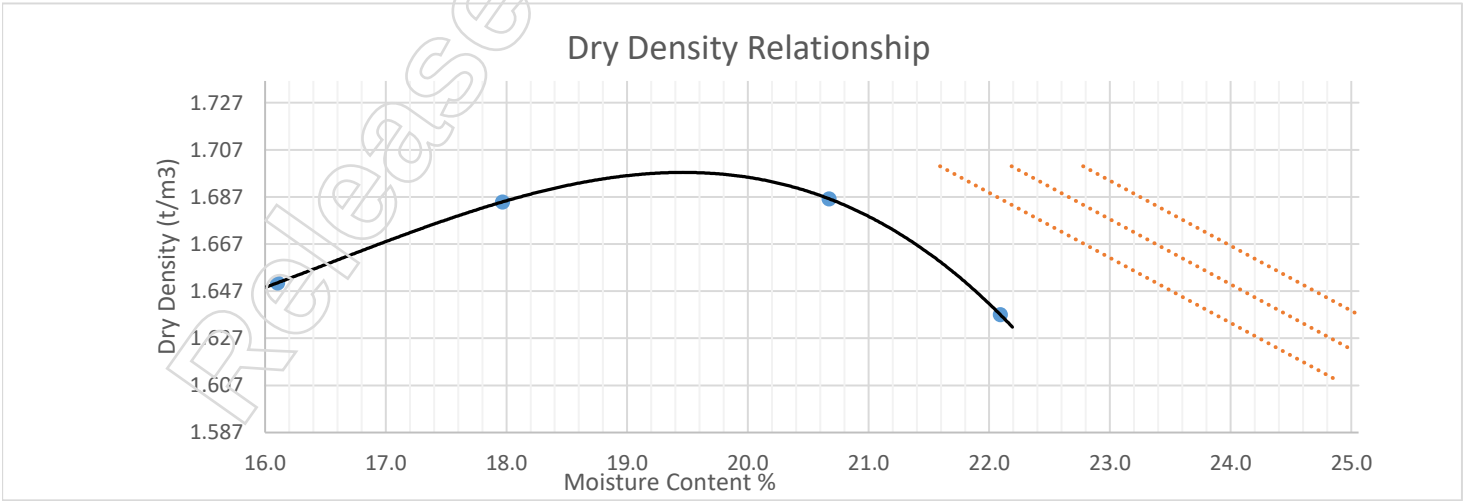
Sample Number:	4343
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.70**			
	Optimum Moisture Content (%)	**19.5**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	50			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4858
Issue No: 1

Sample Details

Sample Number:	4344
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR Nicholls
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**21.0**			
	Achieved Compaction - Dry Density (t/m3)	**1.58**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.57**			
	Achieved Compacted Dry Density (t/m3)	**1.58**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**21.5**			
	Achieved Compaction Moisture Content (%)	**21**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type	**Standard**			

Specimen Number	1	2	3
Dry Density (t/m3)	1.58	1.57	1.58
Specimen Capped	No	No	No
UCS Results (Mpa)	1.7	1.4	1.3
Mean UCS (MPa)	**1.5**		

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4859**
Issue No:	**1**

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4344
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

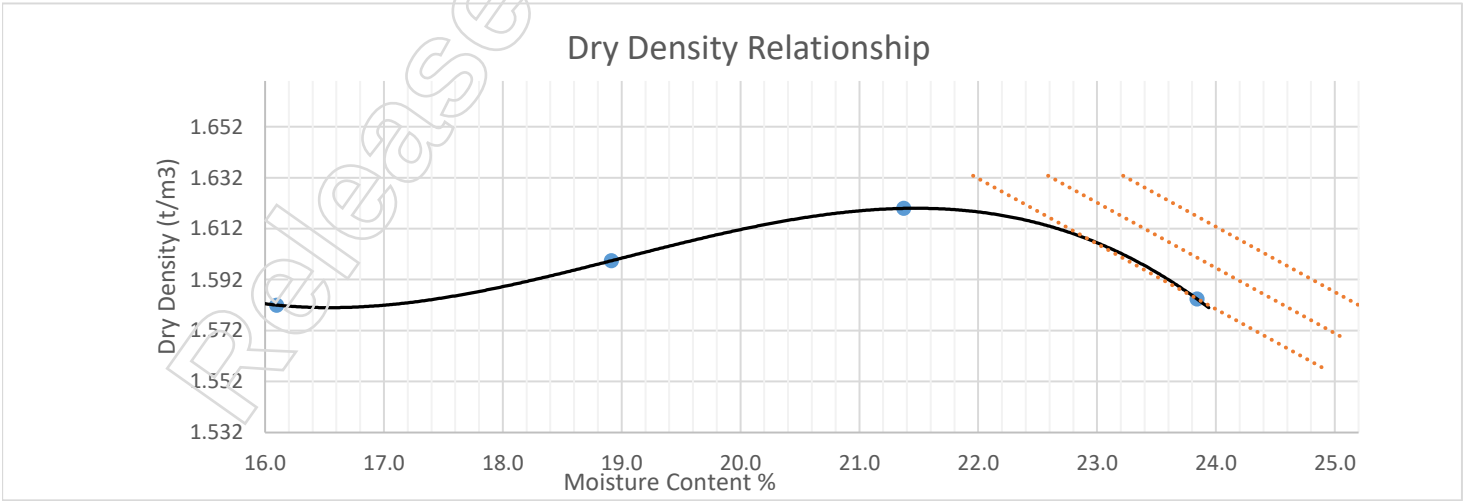
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.62**			
	Optimum Moisture Content (%)	**21.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**3.0**			



Comments:

Released under RTIA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4860
Issue No: 1

Sample Details

Sample Number:	4345
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.9**			
	Achieved Compaction - Dry Density (t/m3)			**1.54**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.54**			
	Achieved Compacted Dry Density (t/m3)			**1.54**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**19.1**			
	Achieved Compaction Moisture Content (%)			**18.9**			
	Achieved Percentage of OMC (%)			**99**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.54	1.55	1.54			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.3	1.2	1.1			
	Mean UCS (MPa)			**1.2**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4861**
Issue No:	**1**

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4345
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

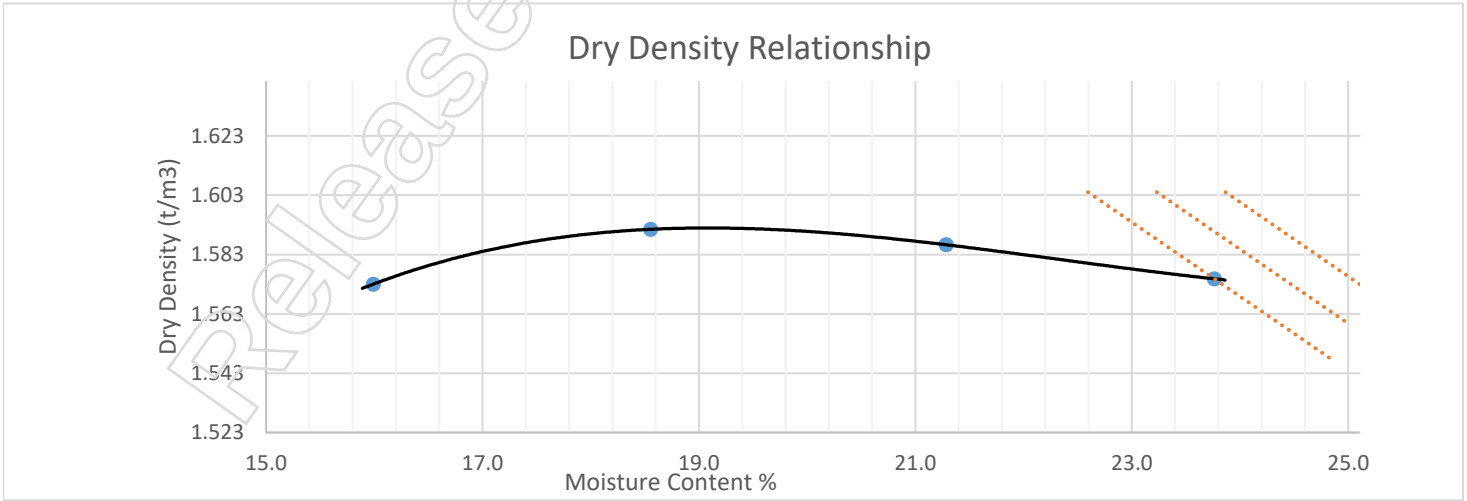
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.59**			
	Optimum Moisture Content (%)	**19.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**5.0**			



Comments:

Released under RTIA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4862
Issue No: 1

Sample Details

Sample Number:	4346
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**21.4**			
	Achieved Compaction - Dry Density (t/m3)	**1.53**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.52**			
	Achieved Compacted Dry Density (t/m3)	**1.53**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**22.0**			
	Achieved Compaction Moisture Content (%)	**21.4**			
	Achieved Percentage of OMC (%)	**97**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.54 1.53 1.53			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.5 2.4 2.2			
	Mean UCS (MPa)	**2.4**			

Released under NATA-ILAC-DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4863**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

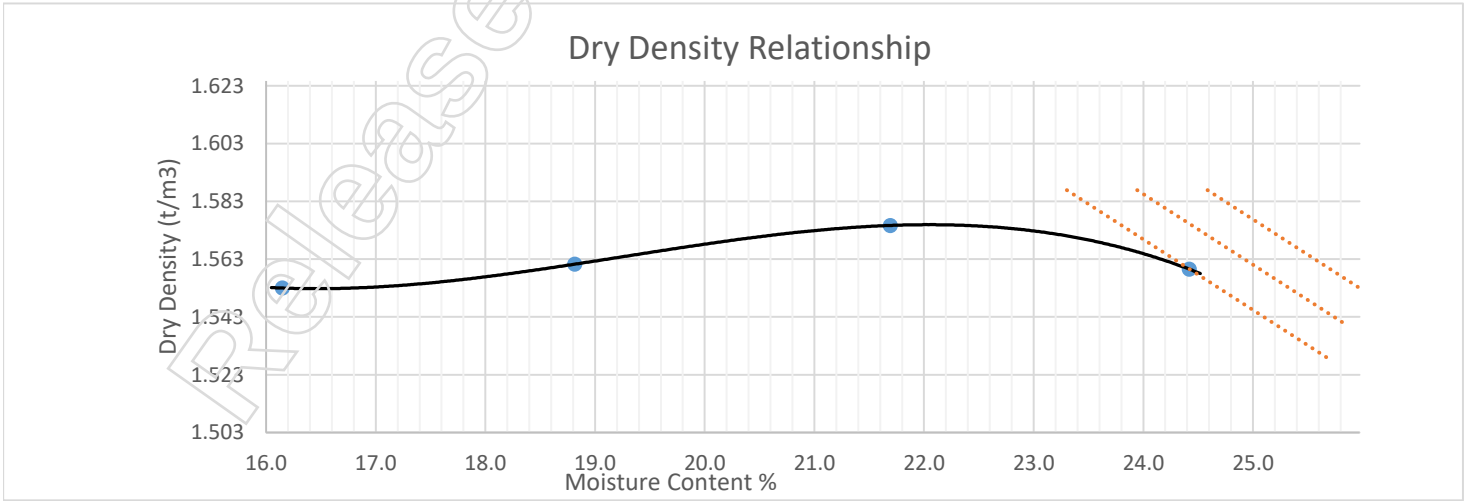
Sample Number:	4346
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.57**			
	Optimum Moisture Content (%)	**22.0**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4864
Issue No: 1

Sample Details

Sample Number:	4347
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details				Results	Min	Max	Tar
Q251A	Sample Type				Laboratory Mixed			
	Compaction Moisture Content (%)				**19.9**			
	Achieved Compaction - Dry Density (t/m3)				**1.52**			
Q115	Stabilising Agent Source				Wagners			
	Stabilising Agent Type				Hydrated Lime			
	Target Stabilising Agent Quantity (%)				9.0			
	ATIC Registration Number				Not Available			
	Curing Duration (days)				28			
	Curing Temperature (Deg C)				23 +/- 2			
	Q135B Curing Method				Air Cured Sealed			
	Target Compacted Dry Density (t/m3)				**1.52**			
	Achieved Compacted Dry Density (t/m3)				**1.52**			
	Achieved Relative Compaction (%)				**97**			
	Target Compaction Moisture Content (%)				**19.5**			
	Achieved Compaction Moisture Content (%)				**19.9**			
	Achieved Percentage of OMC (%)				**102**			
	Compaction Type				**Standard**			
	Specimen Number	1	2	3				
	Dry Density (t/m3)	1.52	1.52	1.52				
	Specimen Capped	No	No	No				
	UCS Results (Mpa)	1.4	1.3	1.4				
	Mean UCS (MPa)				**1.4**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4865**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

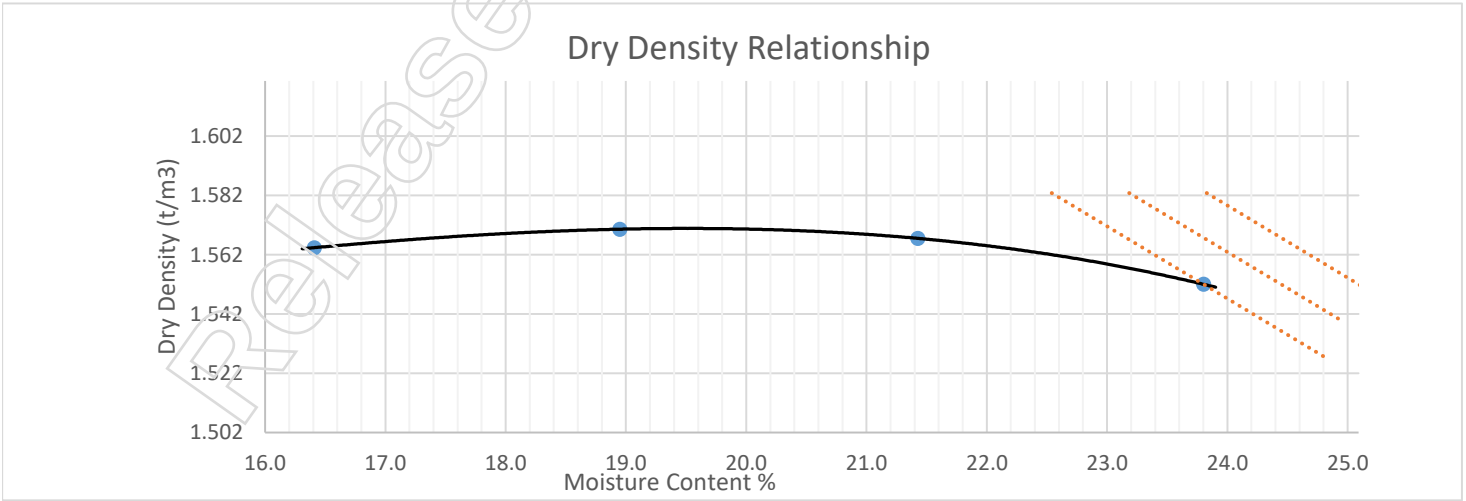
Sample Number:	4347
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.57**			
	Optimum Moisture Content (%)	**19.5**			
Additive Details	Source	Wagners			
	Type	Hydrated Lime			
	ATIC No:	Not Available			
	Quantity (%)	**9.0**			



Released under RTA DTMR

Comments:

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4866
Issue No: 1

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4348
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.3**			
	Achieved Compaction - Dry Density (t/m3)			**1.68**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			0.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.66**			
	Achieved Compacted Dry Density (t/m3)			**1.68**			
	Achieved Relative Compaction (%)			**98.5**			
	Target Compaction Moisture Content (%)			**19.3**			
	Achieved Compaction Moisture Content (%)			**18.3**			
	Achieved Percentage of OMC (%)			**95**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.69	1.68	1.68			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.4	0.4	0.3			
	Mean UCS (MPa)			**0.4**			

Released under NHVR DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4867**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

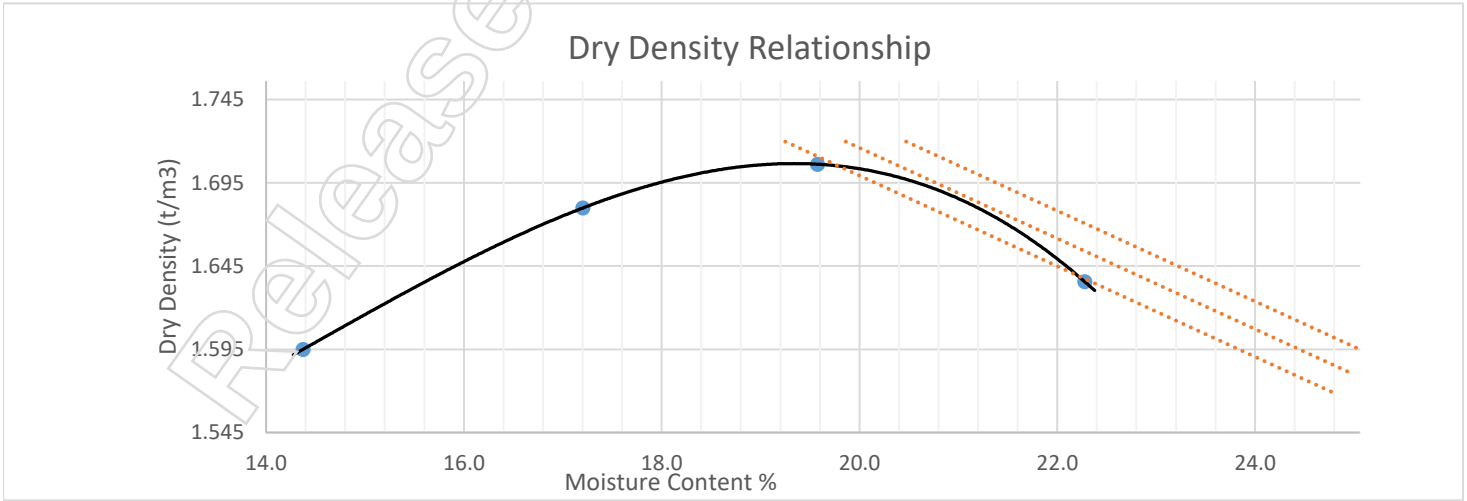
Sample Number:	4348
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.71**			
	Optimum Moisture Content (%)	**19.5**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	50			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4868
Issue No: 1

Sample Details

Sample Number:	4349
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 5/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.6**			
	Achieved Compaction - Dry Density (t/m3)			**1.62**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			1.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.64**			
	Achieved Compacted Dry Density (t/m3)			**1.62**			
	Achieved Relative Compaction (%)			**96**			
	Target Compaction Moisture Content (%)			**18.0**			
	Achieved Compaction Moisture Content (%)			**18.6**			
	Achieved Percentage of OMC (%)			**103**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.63	1.62	1.62			
	Specimen Capped	No	Yes	No			
	UCS Results (Mpa)	0.6	0.6	0.6			
	Mean UCS (MPa)			**0.6**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR@superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4869**
Issue No:	**1**

Sample Details

Sample Number:	4349
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

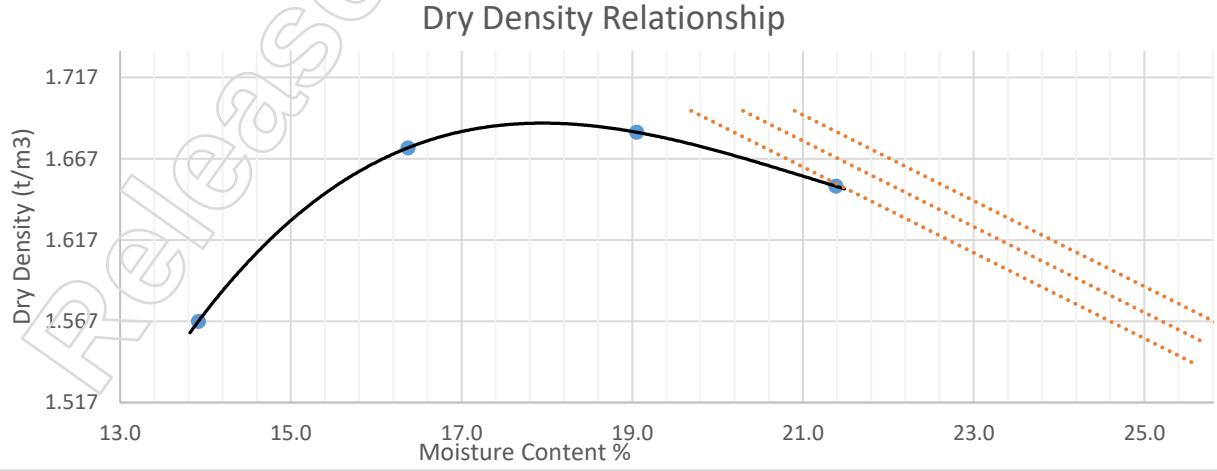
NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 05/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.69**			
	Optimum Moisture Content (%)	**18.0**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**1.0**			



Comments:

Released under RTA DTMR

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4870**
Issue No:	**1**

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4350
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.9**			
	Achieved Compaction - Dry Density (t/m3)			**1.59**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			3.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.58**			
	Achieved Compacted Dry Density (t/m3)			**1.59**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**19.5**			
	Achieved Compaction Moisture Content (%)			**18.9**			
	Achieved Percentage of OMC (%)			**97**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.59	1.58	1.59			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.5	1.6	1.6			
	Mean UCS (MPa)			**1.6**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
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Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4871**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

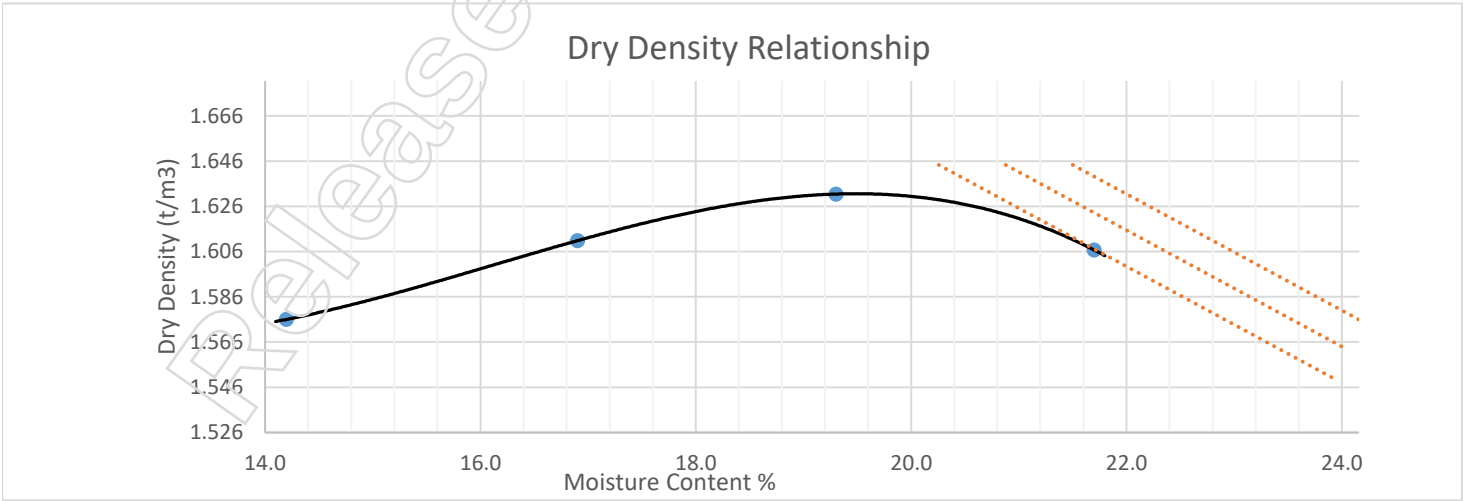
Sample Number:	4350
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.63**			
	Optimum Moisture Content (%)	**19.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**3.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4872
Issue No: 1

Sample Details

Sample Number:	4351
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**20.3**			
	Achieved Compaction - Dry Density (t/m3)			**1.55**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.56**			
	Achieved Compacted Dry Density (t/m3)			**1.55**			
	Achieved Relative Compaction (%)			**96.5**			
	Target Compaction Moisture Content (%)			**20.0**			
	Achieved Compaction Moisture Content (%)			**20.3**			
	Achieved Percentage of OMC (%)			**102**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.56	1.55	1.56			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	2.1	1.9	1.9			
	Mean UCS (MPa)			**2.0**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4873**
Issue No:	**1**

Sample Details

Sample Number:	4351
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

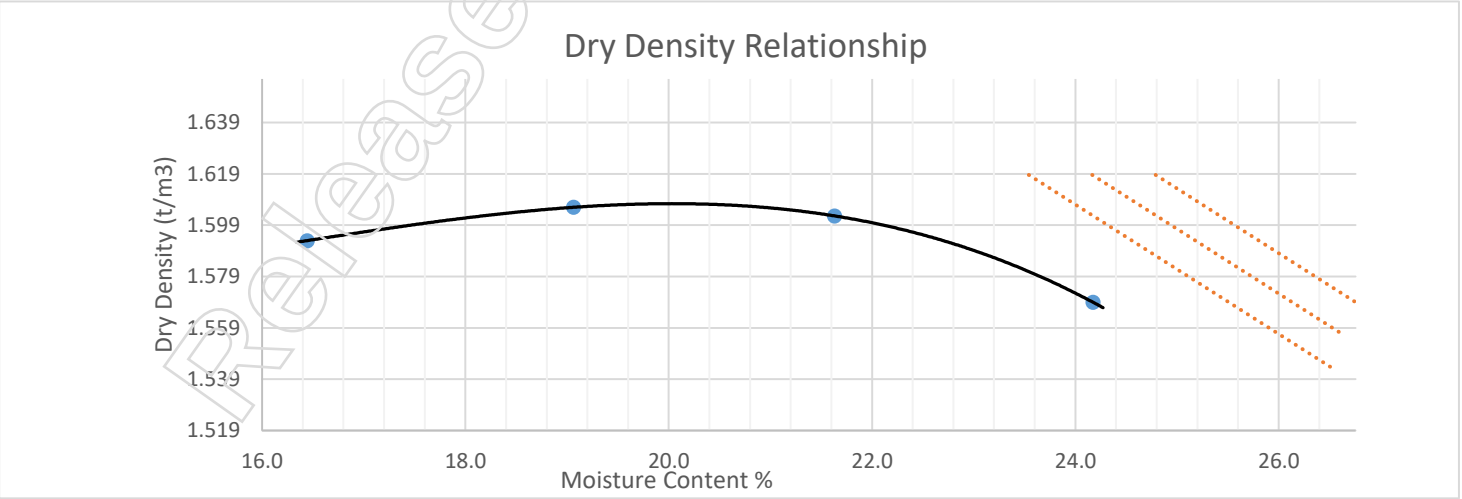
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.61**			
	Optimum Moisture Content (%)	**20.0**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**5.0**			



Comments:

Released under RTMR DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4874
Issue No: 1

Sample Details

Sample Number:	4352
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**20.7**			
	Achieved Compaction - Dry Density (t/m3)	**1.53**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.52**			
	Achieved Compacted Dry Density (t/m3)	**1.53**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**20.6**			
	Achieved Compaction Moisture Content (%)	**20.7**			
	Achieved Percentage of OMC (%)	**100**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.53 1.53 1.53			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.3 2.1 2.2			
	Mean UCS (MPa)	**2.2**			

Released under NATA-ILAC-MRA

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4875**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

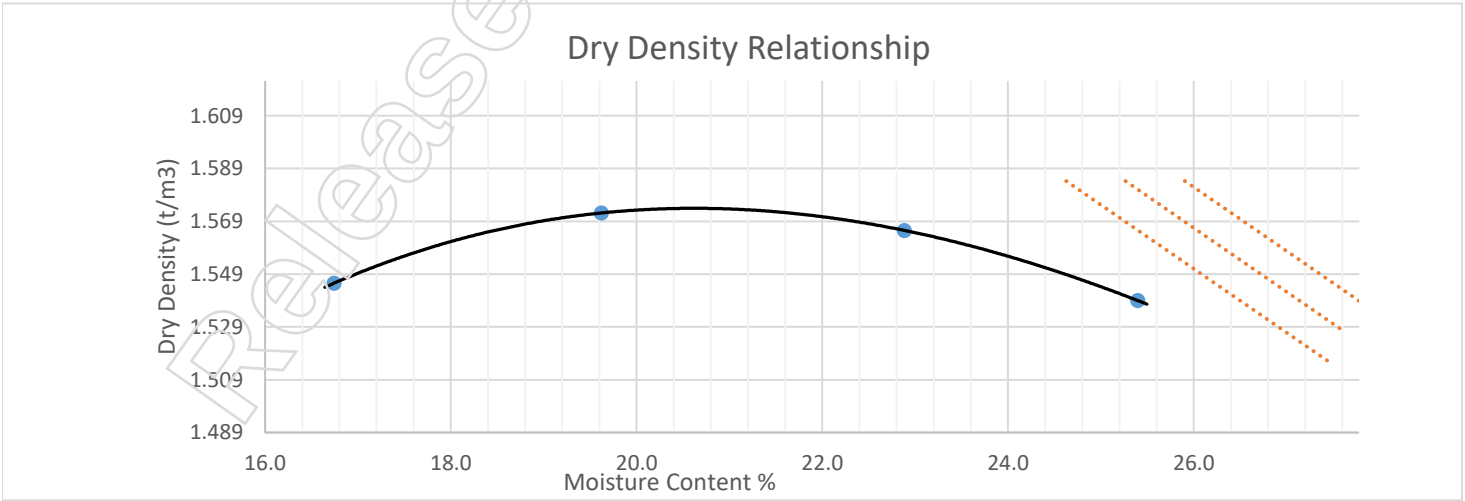
Sample Number:	4352
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.57**			
	Optimum Moisture Content (%)	**20.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4876
Issue No: 1

Sample Details

Sample Number:	4353
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**20.3**			
	Achieved Compaction - Dry Density (t/m3)	**1.62**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	0.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.63**			
	Achieved Compacted Dry Density (t/m3)	**1.62**			
	Achieved Relative Compaction (%)	**96.5**			
	Target Compaction Moisture Content (%)	**19.9**			
	Achieved Compaction Moisture Content (%)	**20.3**			
	Achieved Percentage of OMC (%)	**102**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.62 1.62 1.62			
	Specimen Capped	No No No			
	UCS Results (Mpa)	0.5 0.4 0.5			
	Mean UCS (MPa)	**0.5**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4877**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

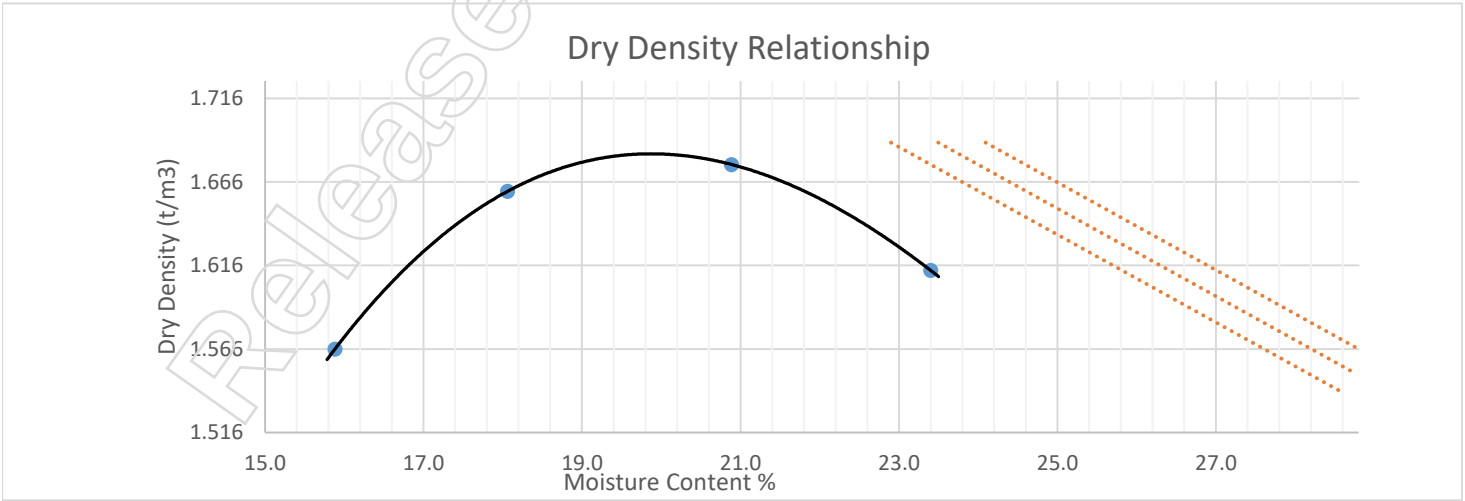
Sample Number:	4353
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.68**			
	Optimum Moisture Content (%)	**20.0**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	51			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4878
Issue No: 1

Sample Details

Sample Number:	4354
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**20.1**			
	Achieved Compaction - Dry Density (t/m3)			**1.60**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			1.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.59**			
	Achieved Compacted Dry Density (t/m3)			**1.6**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**20.4**			
	Achieved Compaction Moisture Content (%)			**20.1**			
	Achieved Percentage of OMC (%)			**99**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.59	1.60	1.60			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.5	0.5	0.5			
	Mean UCS (MPa)			**0.5**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4879**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Sample Details

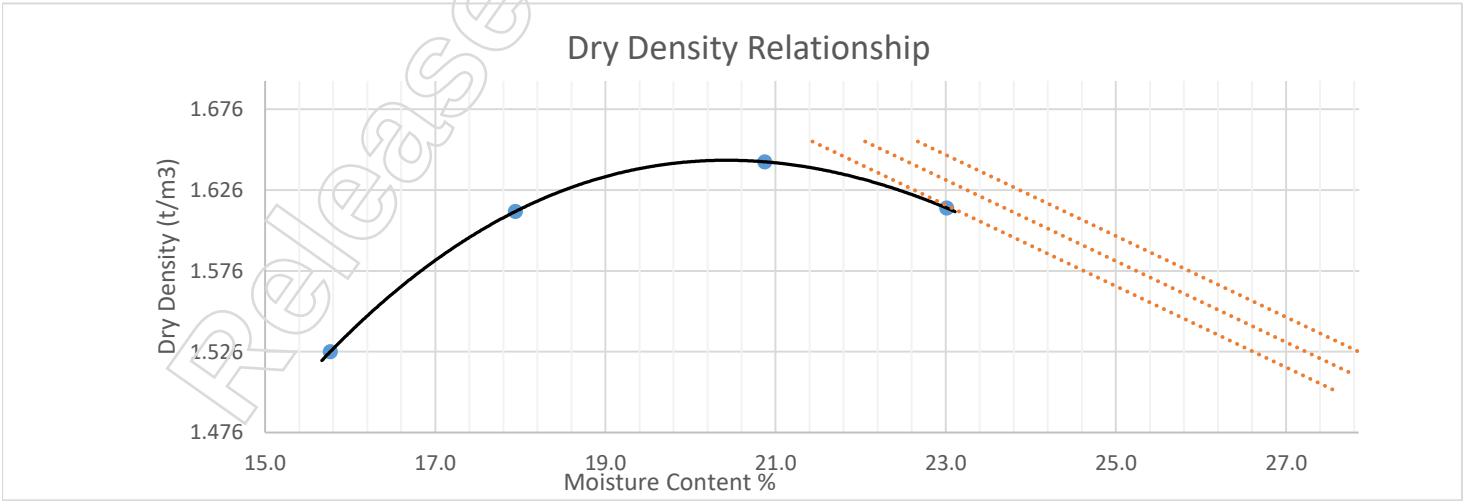
Sample Number:	4354
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.64**			
	Optimum Moisture Content (%)	**20.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**1.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4880
Issue No: 1

Sample Details

Sample Number:	4355
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**20.2**			
	Achieved Compaction - Dry Density (t/m3)			**1.56**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			3.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.56**			
	Achieved Compacted Dry Density (t/m3)			**1.56**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**20.3**			
	Achieved Compaction Moisture Content (%)			**20.2**			
	Achieved Percentage of OMC (%)			**100**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.56	1.56	1.56			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.1	1.1	1.0			
	Mean UCS (MPa)			**1.1**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4881**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Sample Details

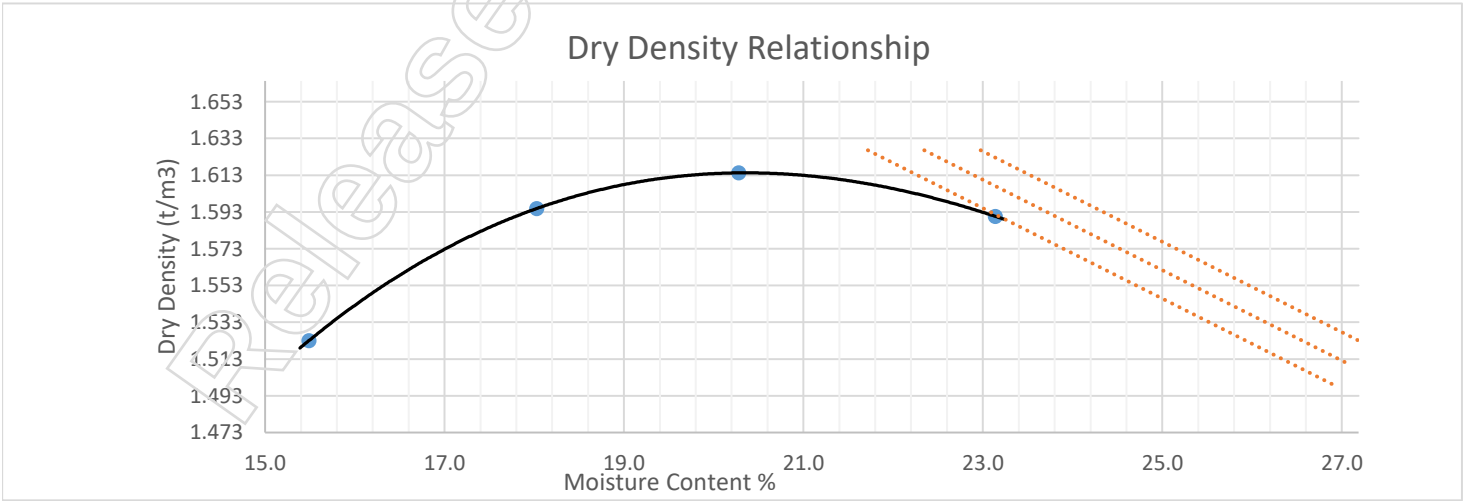
Sample Number:	4355
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.61**			
	Optimum Moisture Content (%)	**20.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**3.0**			



Comments:

Released under RTA DTMR

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4882
Issue No: 1

Sample Details

Sample Number:	4356
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**21.9**			
	Achieved Compaction - Dry Density (t/m3)			**1.54**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.53**			
	Achieved Compacted Dry Density (t/m3)			**1.54**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**22.3**			
	Achieved Compaction Moisture Content (%)			**21.9**			
	Achieved Percentage of OMC (%)			**98**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.54	1.54	1.54			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.7	1.8	1.8			
	Mean UCS (MPa)			**1.8**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4883**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Sample Details

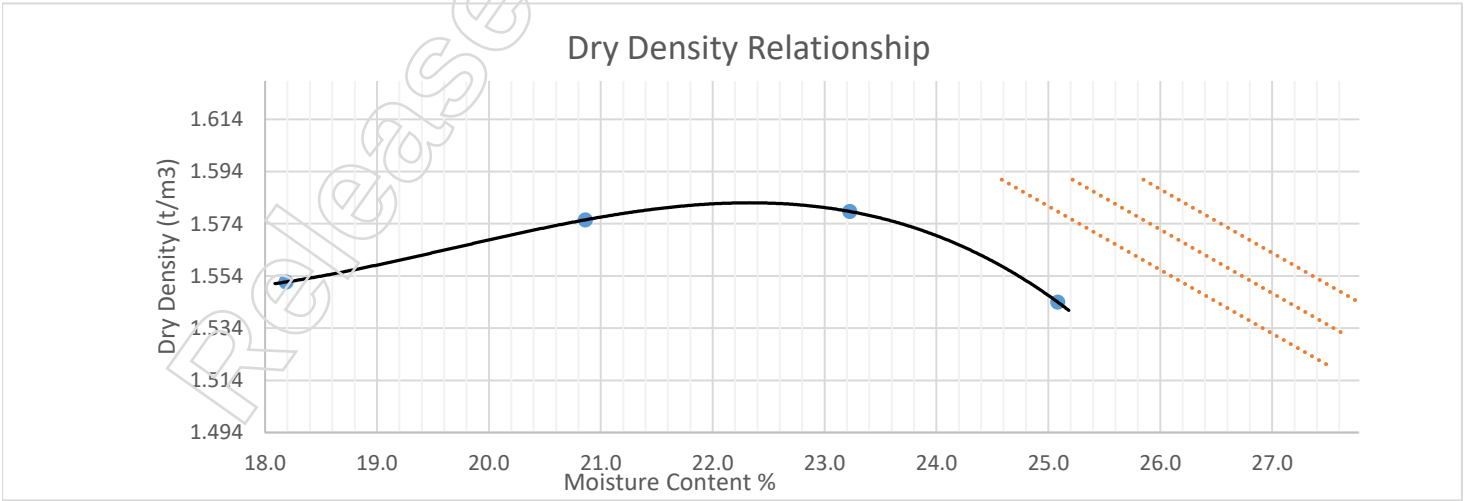
Sample Number:	4356
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.58**			
	Optimum Moisture Content (%)	**22.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**5.0**			



Released under RTA DTMR

Comments:

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR@superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4884
Issue No: 1

Sample Details

Sample Number:	4357
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:
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Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**19.2**			
	Achieved Compaction - Dry Density (t/m3)	**1.55**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.54**			
	Achieved Compacted Dry Density (t/m3)	**1.55**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**19.6**			
	Achieved Compaction Moisture Content (%)	**19.2**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type	**Standard**			

Specimen Number	1	2	3
Dry Density (t/m3)	1.55	1.55	1.55
Specimen Capped	No	No	No
UCS Results (Mpa)	1.2	1.3	1.2
Mean UCS (MPa)	**1.2**		

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4885**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

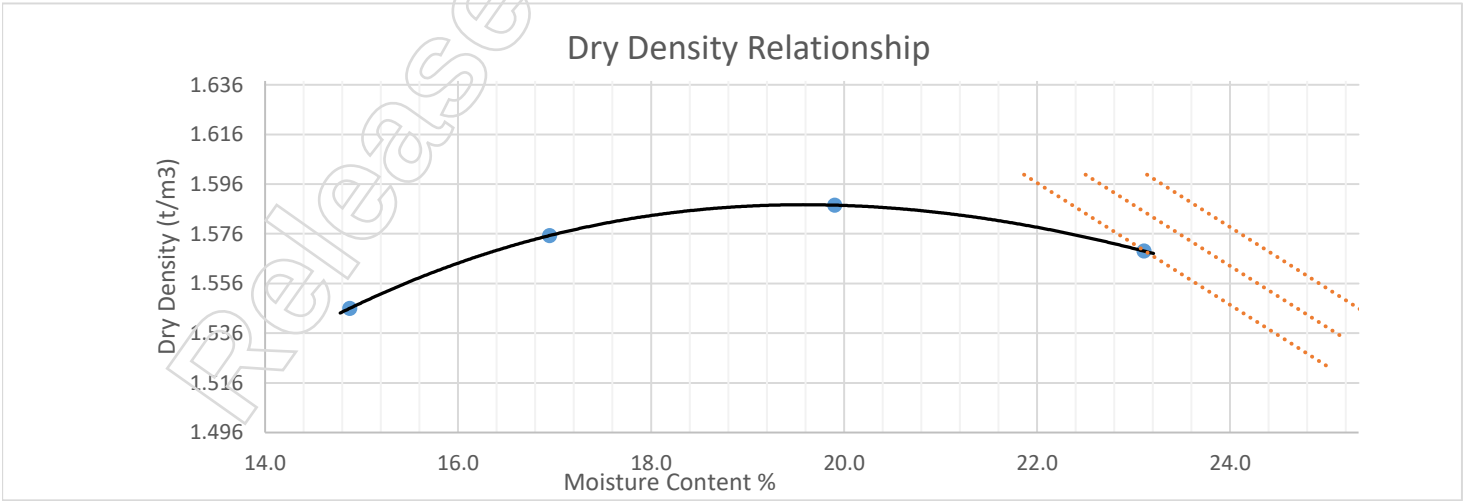
Sample Number:	4357
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.59**			
	Optimum Moisture Content (%)	**19.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4886
Issue No: 1

Sample Details

Sample Number:	4358
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**20.5**			
	Achieved Compaction - Dry Density (t/m3)	**1.60**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	0.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.59**			
	Achieved Compacted Dry Density (t/m3)	**1.6**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**21.0**			
	Achieved Compaction Moisture Content (%)	**20.5**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.66 1.60 1.54			
	Specimen Capped	No No No			
	UCS Results (Mpa)	0.4 0.5 0.4			
	Mean UCS (MPa)	**0.4**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4887**
Issue No:	**1**

Sample Details

Sample Number:	4358
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

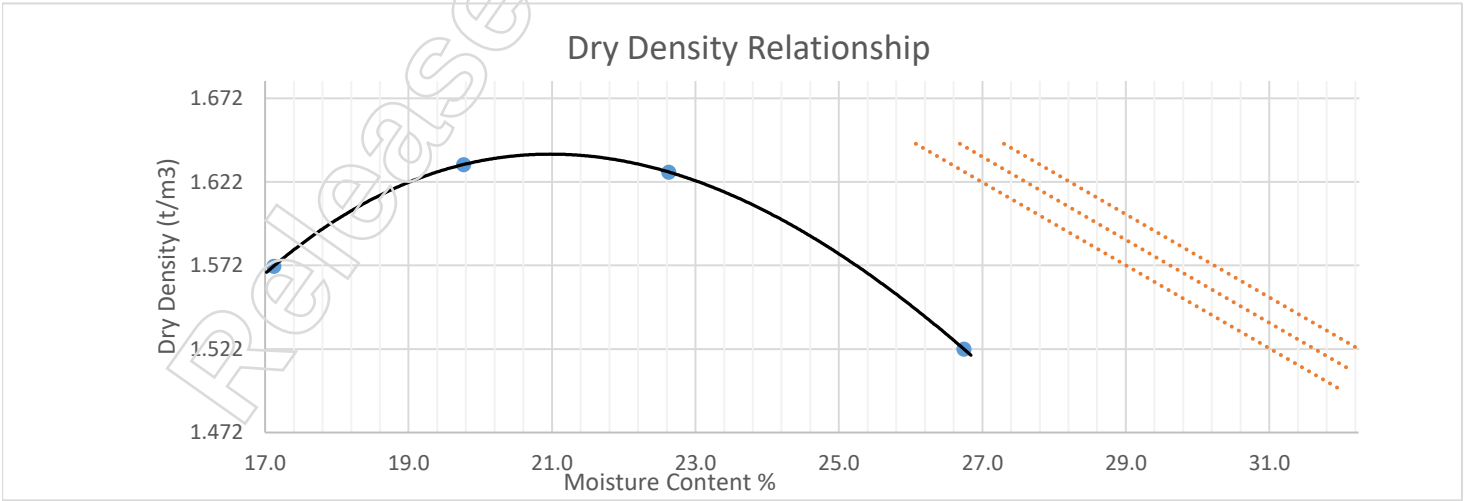
NATA Accredited Laboratory Numbe NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.64**			
	Optimum Moisture Content (%)	**21.0**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	50			



Comments:

Released under RTIA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4888
Issue No: 1

Sample Details

Sample Number:	4359
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**21.7**			
	Achieved Compaction - Dry Density (t/m3)			**1.55**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			1.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.56**			
	Achieved Compacted Dry Density (t/m3)			**1.55**			
	Achieved Relative Compaction (%)			**96.5**			
	Target Compaction Moisture Content (%)			**21.5**			
	Achieved Compaction Moisture Content (%)			**21.7**			
	Achieved Percentage of OMC (%)			**101**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.56	1.55	1.55			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.4	0.5	0.5			
	Mean UCS (MPa)			**0.5**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4889**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

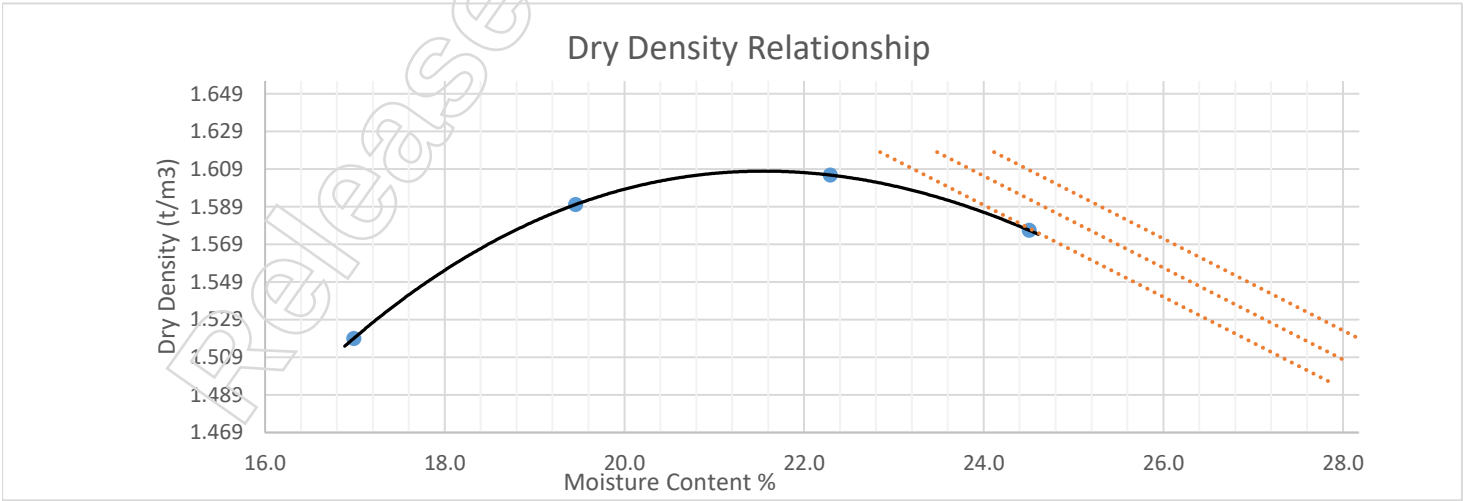
Sample Number:	4359
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.61**			
	Optimum Moisture Content (%)	**21.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**1.5**			



Comments:

Released under RTIA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4890
Issue No: 1

Sample Details

Sample Number:	4360
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Numbe NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**20.8**			
	Achieved Compaction - Dry Density (t/m3)			**1.53**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			3.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.52**			
	Achieved Compacted Dry Density (t/m3)			**1.53**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**21.1**			
	Achieved Compaction Moisture Content (%)			**20.8**			
	Achieved Percentage of OMC (%)			**99**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.53	1.53	1.53			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.9	0.8	0.8			
	Mean UCS (MPa)			**0.8**			

Released under NATA DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4891**
Issue No:	**1**

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

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Sample Details

Sample Number:	4360
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

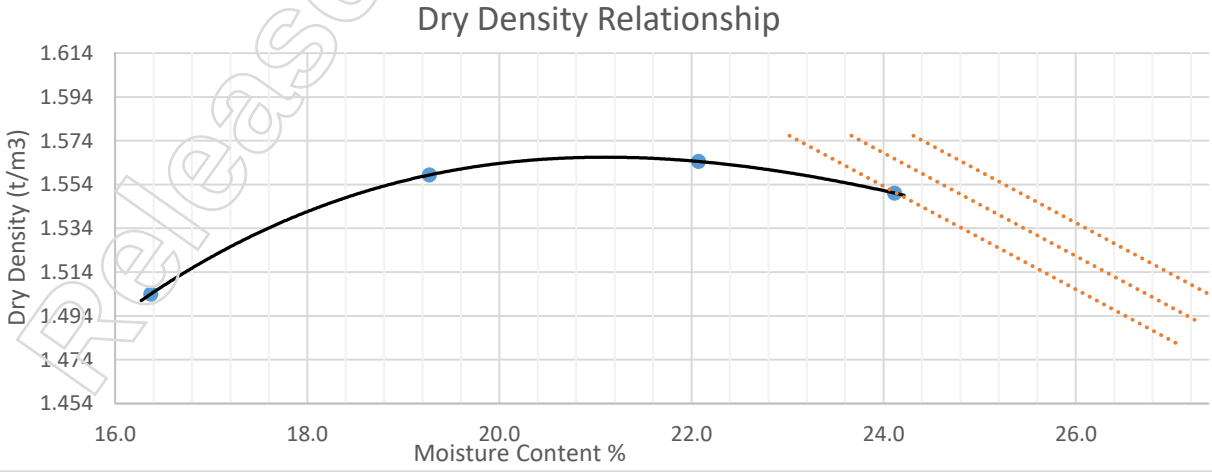
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.57**			
	Optimum Moisture Content (%)	**21.0**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**3.5**			



Comments:

Released under RTIA DTMR

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4892**
Issue No:	**1**

Sample Details

Sample Number:	4361
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**20.6**			
	Achieved Compaction - Dry Density (t/m3)			**1.52**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.52**			
	Achieved Compacted Dry Density (t/m3)			**1.52**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**20.5**			
	Achieved Compaction Moisture Content (%)			**20.6**			
	Achieved Percentage of OMC (%)			**100**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.52	1.52	1.52			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.1	1.1	1.1			
	Mean UCS (MPa)			**1.1**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4893**
Issue No:	**1**

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
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Sample Details

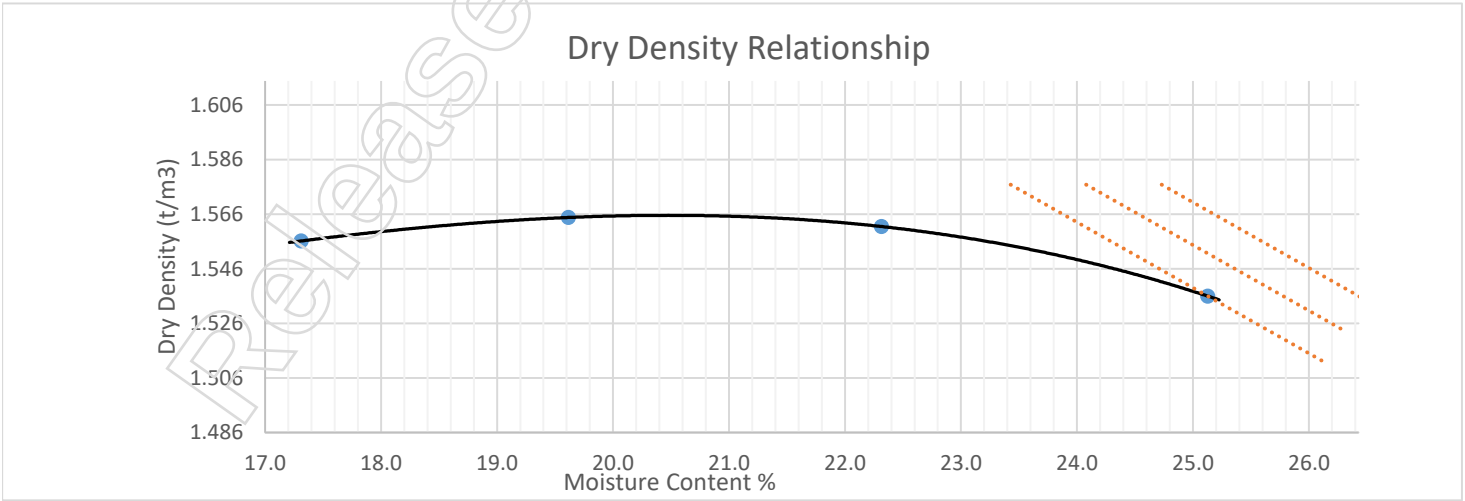
Sample Number:	4361
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.57**			
	Optimum Moisture Content (%)	**20.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**5.5**			



Comments:

Released under RTI DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
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Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4894
Issue No: 1

Sample Details

Sample Number:	4362
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**20.1**			
	Achieved Compaction - Dry Density (t/m3)			**1.52**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			7.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.51**			
	Achieved Compacted Dry Density (t/m3)			**1.52**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**20.2**			
	Achieved Compaction Moisture Content (%)			**20.1**			
	Achieved Percentage of OMC (%)			**100**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.51	1.52	1.52			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.1	1.1	1.1			
	Mean UCS (MPa)			**1.1**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4895**
Issue No:	**1**

Sample Details

Sample Number:	4362
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

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Report Notes:

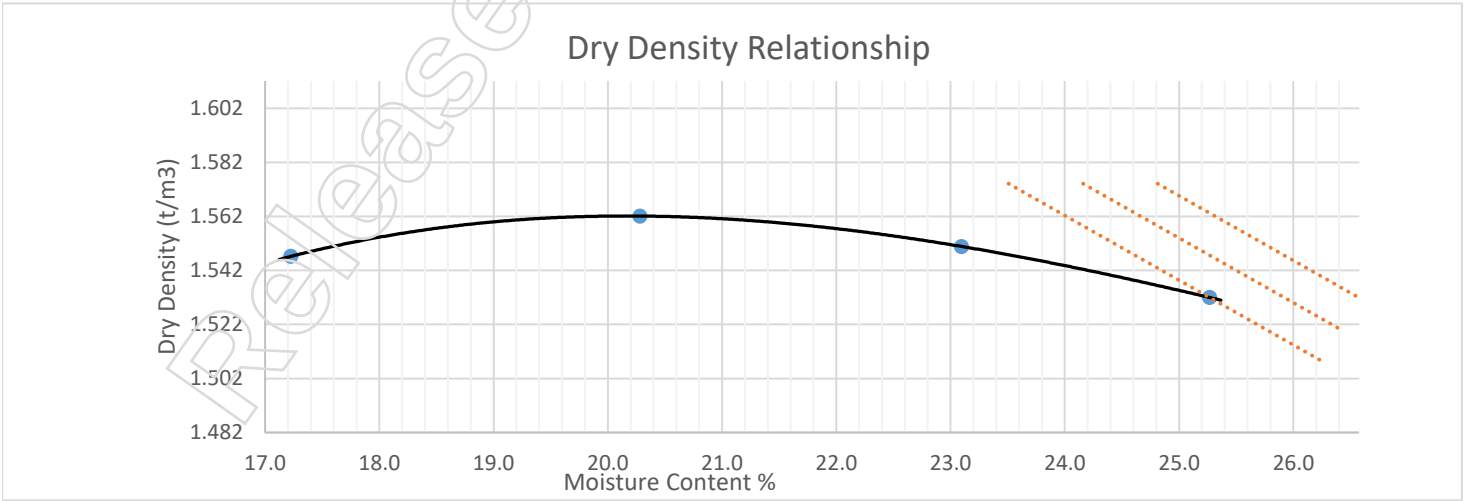
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.56**			
	Optimum Moisture Content (%)	**20.0**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.5**			



Comments:

Released under RTI DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4896
Issue No: 1

Sample Details

Sample Number:	4363
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.2**			
	Achieved Compaction - Dry Density (t/m3)			**1.68**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			0.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.69**			
	Achieved Compacted Dry Density (t/m3)			**1.68**			
	Achieved Relative Compaction (%)			**96.5**			
	Target Compaction Moisture Content (%)			**17.6**			
	Achieved Compaction Moisture Content (%)			**18.2**			
	Achieved Percentage of OMC (%)			**103**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.68	1.67	1.67			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.5	0.4	0.3			
	Mean UCS (MPa)			**0.4**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4897**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
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Sample Details

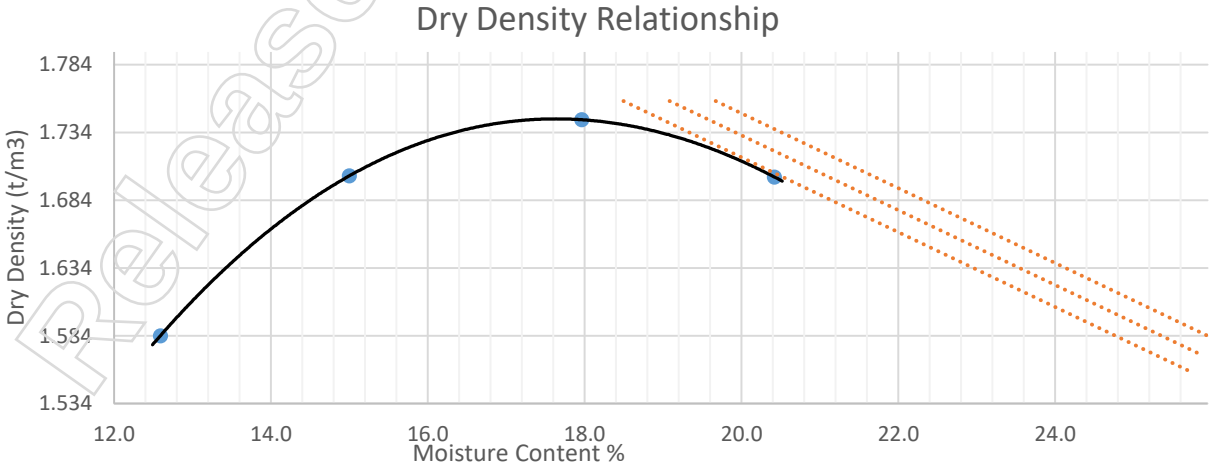
Sample Number:	4363
Client Reference:	0% Lime
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.74**			
	Optimum Moisture Content (%)	**17.5**			
	Determination of Plasticity Method	Visual Assessment			
	Duration of Curing (hrs)	50			



Comments:

Released under RTMR DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4898
Issue No: 1

Sample Details

Sample Number:	4364
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:
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Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.3**			
	Achieved Compaction - Dry Density (t/m3)			**1.67**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			1.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.67**			
	Achieved Compacted Dry Density (t/m3)			**1.67**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**17.7**			
	Achieved Compaction Moisture Content (%)			**18.3**			
	Achieved Percentage of OMC (%)			**103**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.67	1.66	1.67			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	0.5	0.5	0.5			
	Mean UCS (MPa)			**0.5**			

Released under NATA D-TMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4899**
Issue No:	**1**

Sample Details

Sample Number:	4364
Client Reference:	Lime Demand -2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

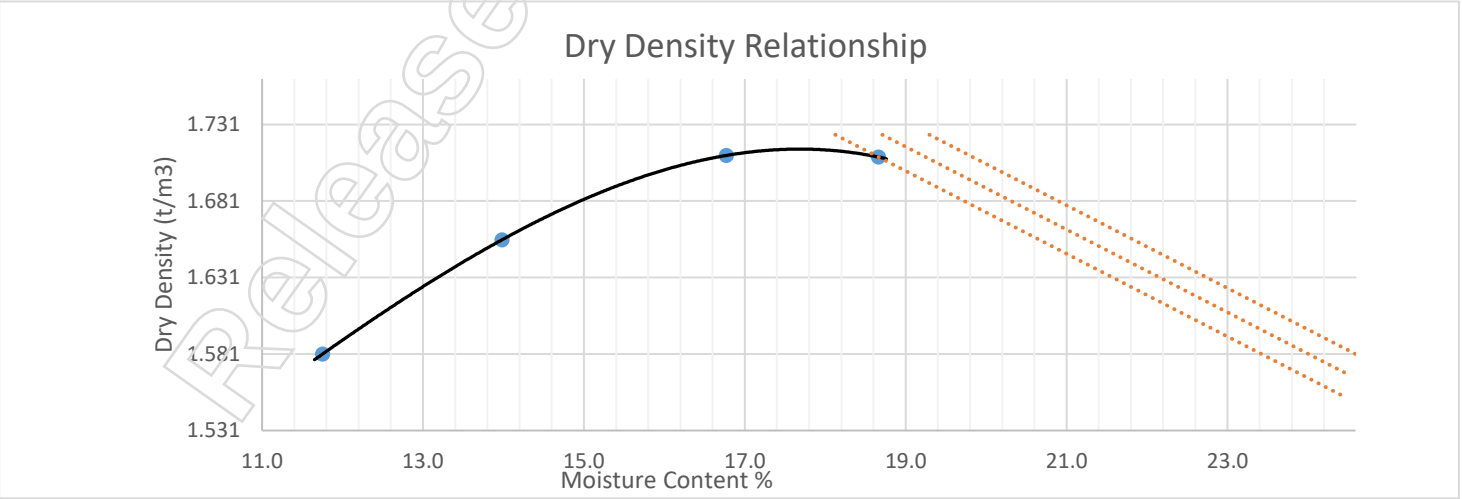
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Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.72**			
	Optimum Moisture Content (%)	**17.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**1.0**			



Comments:

Released under RTIA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
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Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4900
Issue No: 1

Sample Details

Sample Number:	4365
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
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2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**19.1**			
	Achieved Compaction - Dry Density (t/m3)	**1.63**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.64**			
	Achieved Compacted Dry Density (t/m3)	**1.63**			
	Achieved Relative Compaction (%)	**96.5**			
	Target Compaction Moisture Content (%)	**18.6**			
	Achieved Compaction Moisture Content (%)	**19.1**			
	Achieved Percentage of OMC (%)	**103**			
	Compaction Type	**Standard**			

Specimen Number	1	2	3
Dry Density (t/m3)	1.63	1.63	1.63
Specimen Capped	No	No	No
UCS Results (Mpa)	0.8	1.2	1.3
Mean UCS (MPa)	**1.1**		

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4902**
Issue No:	**1**

NATA Accredited Laboratory Numbe NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4365
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

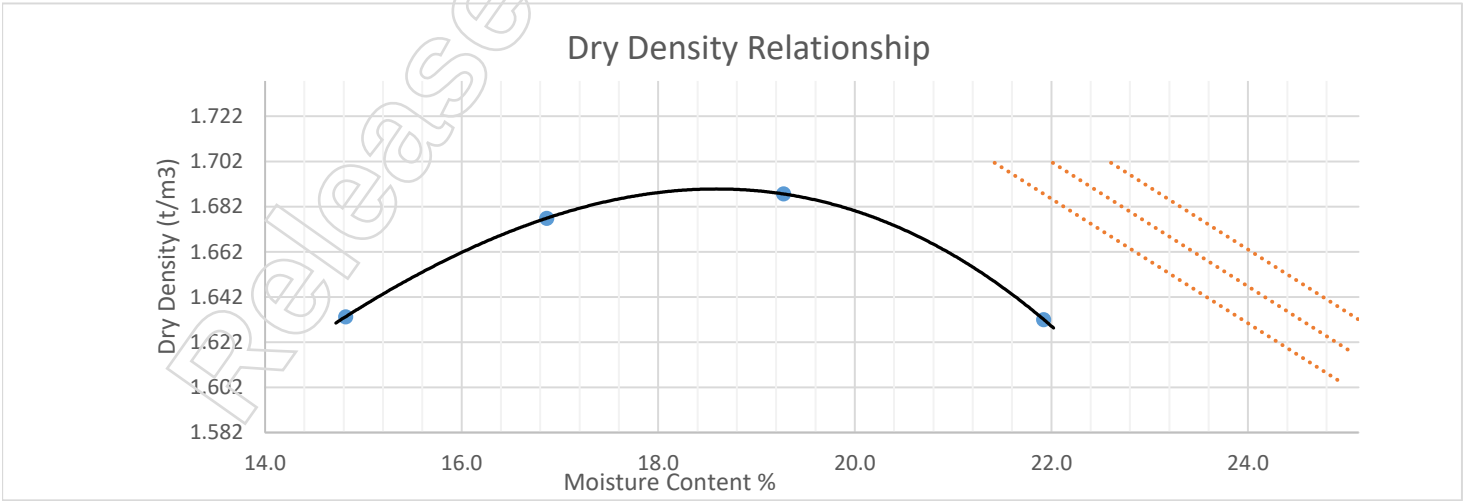
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.69**			
	Optimum Moisture Content (%)	**18.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**3.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4903
Issue No: 1

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4366
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**17.9**			
	Achieved Compaction - Dry Density (t/m3)	**1.62**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	5.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.63**			
	Achieved Compacted Dry Density (t/m3)	**1.62**			
	Achieved Relative Compaction (%)	**96.5**			
	Target Compaction Moisture Content (%)	**17.4**			
	Achieved Compaction Moisture Content (%)	**17.9**			
	Achieved Percentage of OMC (%)	**103**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.62 1.62 1.63			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.3 1.2 1.3			
	Mean UCS (MPa)	**1.3**			

Released under NATA - DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4904**
Issue No:	**1**

Sample Details

Sample Number:	4366
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 6/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

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Report Notes:

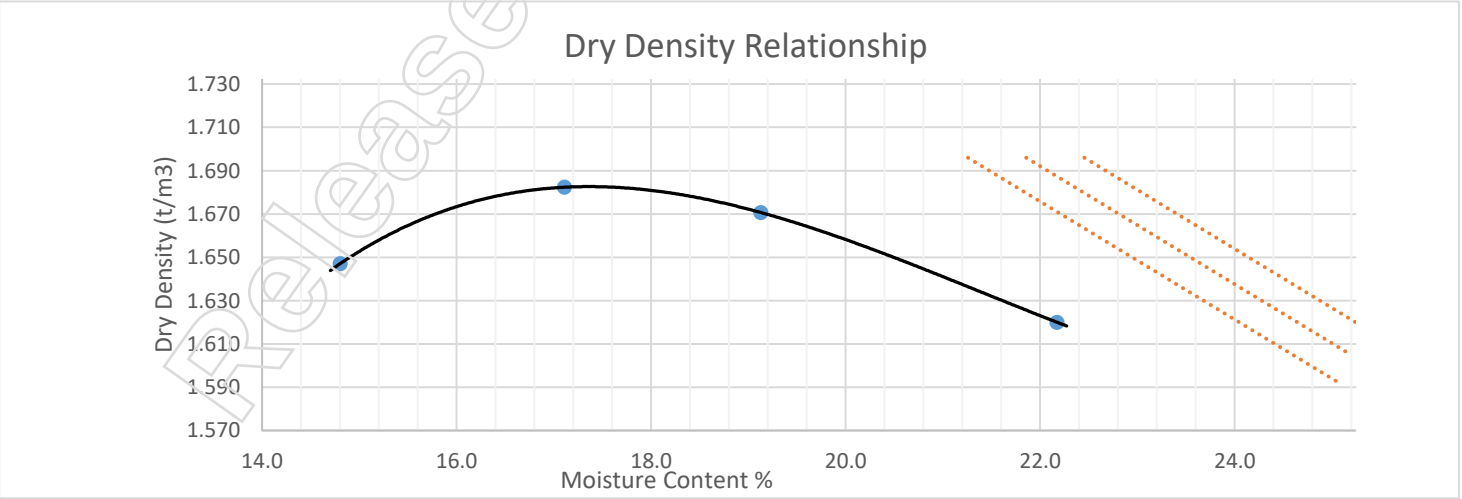
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.68**			
	Optimum Moisture Content (%)	**17.5**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**5.0**			



Comments:

Released under RTA DTMR

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4905
Issue No: 1

Sample Details

Sample Number:	4367
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.1**			
	Achieved Compaction - Dry Density (t/m3)			**1.60**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			7.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.61**			
	Achieved Compacted Dry Density (t/m3)			**1.6**			
	Achieved Relative Compaction (%)			**96.5**			
	Target Compaction Moisture Content (%)			**17.2**			
	Achieved Compaction Moisture Content (%)			**18.1**			
	Achieved Percentage of OMC (%)			**105**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.61	1.60	1.60			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.2	1.2	1.3			
	Mean UCS (MPa)			**1.2**			

Released under NHL-DTMR

Comments:

Dry Density-Moisture Relationship Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4906**
Issue No:	**1**

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 6/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

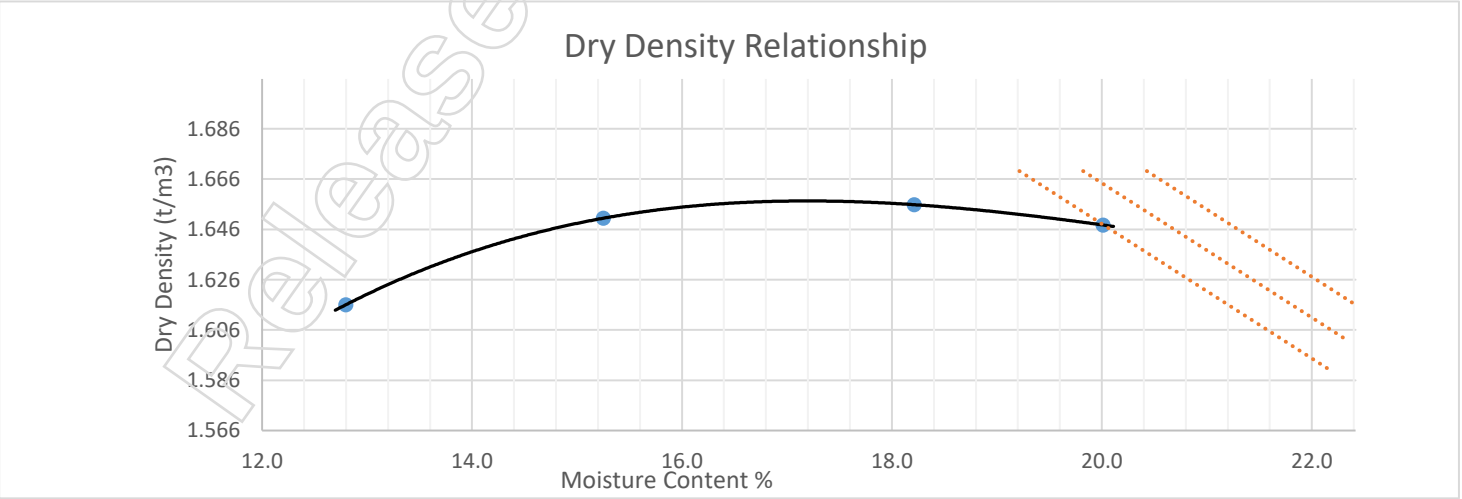
Sample Number:	4367
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 06/05/2021

Test Results

Test Method	Details	Result	Min	Max	Tar
Q142A	Maximum Dry Density (t/m3)	**1.66**			
	Optimum Moisture Content (%)	**17.0**			
Additive Details	Source	Wagners			
	Type	Hydrated lime			
	ATIC No:	Not Available			
	Quantity (%)	**7.0**			



Comments:

Released under RTA DTMR

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
ACN: 614 194 900
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4931**
Issue No:	**1**

Sample Details

Sample Number:	4314
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

NR

Approved Signatory: NR

Date of Issue: 11/05/2021

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 11/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q133	Hydrated Lime Content (%)	**3.0**			
	Source of Hydrated Lime	Wagners			

Released under PPL - DTMR

Comments:

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4905
Issue No: 2
This report replaces all previous issues of report No.: 4905

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance w th ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4367
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.1**			
	Achieved Compaction - Dry Density (t/m3)			**1.60**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			7.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.61**			
	Achieved Compacted Dry Density (t/m3)			**1.6**			
	Achieved Relative Compaction (%)			**96.5**			
	Target Compaction Moisture Content (%)			**17.2**			
	Achieved Compaction Moisture Content (%)			**18.1**			
	Achieved Percentage of OMC (%)			**105**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.61	1.60	1.60			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.2	1.2	1.3			
	Mean UCS (MPa)			**1.2**			
Q125D	Initial Height of Specimen (mm)			**115**			
	Rise Time (hrs)			**3.0**			
	Capillary Rise (%)			**100**			

Comments:
Reissue Reason: Q125D Results added

Released under EIL - DTMR

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4903**
Issue No:	**2**

This report replaces all previous issues of report No.: 4903

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 24/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4366
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**17.9**			
	Achieved Compaction - Dry Density (t/m3)	**1.62**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	5.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.63**			
	Achieved Compacted Dry Density (t/m3)	**1.62**			
	Achieved Relative Compaction (%)	**96.5**			
	Target Compaction Moisture Content (%)	**17.4**			
	Achieved Compaction Moisture Content (%)	**17.9**			
	Achieved Percentage of OMC (%)	**103**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.62 1.62 1.63			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.3 1.2 1.3			
	Mean UCS (MPa)	**1.3**			
Q125D	Initial Height of Specimen (mm)	**114**			
	Rise Time (hrs)	**2.0**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4900
Issue No: 2
This report replaces all previous issues of report No.: 4900

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4365
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-109
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**19.1**			
	Achieved Compaction - Dry Density (t/m3)	**1.63**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.64**			
	Achieved Compacted Dry Density (t/m3)	**1.63**			
	Achieved Relative Compaction (%)	**96.5**			
	Target Compaction Moisture Content (%)	**18.6**			
	Achieved Compaction Moisture Content (%)	**19.1**			
	Achieved Percentage of OMC (%)	**103**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.63 1.63 1.63			
	Specimen Capped	No No No			
	UCS Results (Mpa)	0.8 1.2 1.3			
	Mean UCS (MPa)	**1.1**			
Q125D	Initial Height of Specimen (mm)	**115**			
	Rise Time (hrs)	**1.5**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
ACN: 614 194 900
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4930**
Issue No:	**1**

Sample Details

Sample Number:	4313
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 11/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 11/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q133	Hydrated Lime Content (%)	**3.5**			
	Source of Hydrated Lime	Wagners			

Released under PIL - DTMR

Comments:

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4894
Issue No: 2
This report replaces all previous issues of report No.: 4894

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance w th ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4362
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**20.1**			
	Achieved Compaction - Dry Density (t/m3)	**1.52**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.5			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.51**			
	Achieved Compacted Dry Density (t/m3)	**1.52**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**20.2**			
	Achieved Compaction Moisture Content (%)	**20.1**			
	Achieved Percentage of OMC (%)	**100**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.51 1.52 1.52			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.1 1.1 1.1			
	Mean UCS (MPa)	**1.1**			
Q125D	Initial Height of Specimen (mm)	**115**			
	Rise Time (hrs)	**1.5**			
	Capillary Rise (%)	**100**			

Comments:
Reissue Reason: Q125D Results added

Released under EXIL - DTMR

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4892
Issue No: 2
This report replaces all previous issues of report No.: 4892

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4361
Client Reference: Lime Demand +2%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-108
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**20.6**			
	Achieved Compaction - Dry Density (t/m3)			**1.52**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.52**			
	Achieved Compacted Dry Density (t/m3)			**1.52**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**20.5**			
	Achieved Compaction Moisture Content (%)			**20.6**			
	Achieved Percentage of OMC (%)			**100**			
	Compaction Type			**Standard**			
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.52	1.52	1.52			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.1	1.1	1.1			
	Mean UCS (MPa)			**1.1**			
Q125D	Initial Height of Specimen (mm)			**114**			
	Rise Time (hrs)			**1.0**			
	Capillary Rise (%)			**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4890**
Issue No:	**2**

This report replaces all previous issues of report No.: 4890

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 24/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4360
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-108
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**20.8**			
	Achieved Compaction - Dry Density (t/m3)	**1.53**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.5			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.52**			
	Achieved Compacted Dry Density (t/m3)	**1.53**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**21.1**			
	Achieved Compaction Moisture Content (%)	**20.8**			
	Achieved Percentage of OMC (%)	**99**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.53 1.53 1.53			
	Specimen Capped	No No No			
	UCS Results (Mpa)	0.9 0.8 0.8			
	Mean UCS (MPa)	**0.8**			
Q125D	Initial Height of Specimen (mm)	**115**			
	Rise Time (hrs)	**1.0**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
ACN: 614 194 900
Address: Unit 4/189 Anzac Avenue
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Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4929**
Issue No:	**1**

Sample Details

Sample Number:	4312
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

NR

Approved Signatory: NR

Date of Issue: 11/05/2021

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 11/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q133	Hydrated Lime Content (%)	**3.0**			
	Source of Hydrated Lime	Wagners			

Released under PPL - DTMR

Comments:

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4884
Issue No: 2
This report replaces all previous issues of report No.: 4884

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4357
Client Reference: Lime Demand +4%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-107
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**19.2**			
	Achieved Compaction - Dry Density (t/m3)	**1.55**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.54**			
	Achieved Compacted Dry Density (t/m3)	**1.55**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**19.6**			
	Achieved Compaction Moisture Content (%)	**19.2**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.55 1.55 1.55			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.2 1.3 1.2			
	Mean UCS (MPa)	**1.2**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**1.5**			
	Capillary Rise (%)	**100**			

Released under NATA D-MR

Comments:
Reissue Reason: Q125D Results added

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
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Unconfined Compressive Strength Report

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4882
Issue No: 2
This report replaces all previous issues of report No.: 4882

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4356
Client Reference: Lime Demand +2%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-107
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**21.9**			
	Achieved Compaction - Dry Density (t/m3)	**1.54**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	5.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.53**			
	Achieved Compacted Dry Density (t/m3)	**1.54**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**22.3**			
	Achieved Compaction Moisture Content (%)	**21.9**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.54 1.54 1.54			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.7 1.8 1.8			
	Mean UCS (MPa)	**1.8**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**2.5**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
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Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4880**
Issue No:	**2**

This report replaces all previous issues of report No.: 4880

Sample Details

Sample Number:	4355
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-107
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**20.2**			
	Achieved Compaction - Dry Density (t/m3)	**1.56**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.56**			
	Achieved Compacted Dry Density (t/m3)	**1.56**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**20.3**			
	Achieved Compaction Moisture Content (%)	**20.2**			
	Achieved Percentage of OMC (%)	**100**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.56 1.56 1.56			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.1 1.1 1.0			
	Mean UCS (MPa)	**1.1**			
Q125D	Initial Height of Specimen (mm)	**114**			
	Rise Time (hrs)	**1.0**			
	Capillary Rise (%)	**100**			

Released under NATA-DTMR

Comments:
Reissue Reason: Q125D Results added

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
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Address: Unit 4/189 Anzac Avenue
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Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4928**
Issue No:	**1**

Sample Details

Sample Number:	4311
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

NR

Approved Signatory: NR

Date of Issue: 11/05/2021

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 11/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q133	Hydrated Lime Content (%)	**3.0**			
	Source of Hydrated Lime	Wagners			

Released under PPL - DTMR

Comments:

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4874**
Issue No:	**2**

This report replaces all previous issues of report No.: 4874

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 24/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4352
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**20.7**			
	Achieved Compaction - Dry Density (t/m3)	**1.53**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.52**			
	Achieved Compacted Dry Density (t/m3)	**1.53**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**20.6**			
	Achieved Compaction Moisture Content (%)	**20.7**			
	Achieved Percentage of OMC (%)	**100**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.53 1.53 1.53			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.3 2.1 2.2			
	Mean UCS (MPa)	**2.2**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**1.5**			
	Capillary Rise (%)	**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
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Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4872**
Issue No:	**2**

This report replaces all previous issues of report No.: 4872

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 24/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4351
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**20.3**			
	Achieved Compaction - Dry Density (t/m3)	**1.55**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	5.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.56**			
	Achieved Compacted Dry Density (t/m3)	**1.55**			
	Achieved Relative Compaction (%)	**96.5**			
	Target Compaction Moisture Content (%)	**20.0**			
	Achieved Compaction Moisture Content (%)	**20.3**			
	Achieved Percentage of OMC (%)	**102**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.56 1.55 1.56			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.1 1.9 1.9			
	Mean UCS (MPa)	**2.0**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**1.5**			
	Capillary Rise (%)	**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4870
Issue No: 2
This report replaces all previous issues of report No.: 4870

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4350
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-106
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.9**			
	Achieved Compaction - Dry Density (t/m3)			**1.59**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			3.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.58**			
	Achieved Compacted Dry Density (t/m3)			**1.59**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**19.5**			
	Achieved Compaction Moisture Content (%)			**18.9**			
	Achieved Percentage of OMC (%)			**97**			
	Compaction Type						
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.59	1.58	1.59			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.5	1.6	1.6			
	Mean UCS (MPa)			**1.6**			
Q125D	Initial Height of Specimen (mm)			**114**			
	Rise Time (hrs)			**1.0**			
	Capillary Rise (%)			**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
ACN: 614 194 900
Address: Unit 4/189 Anzac Avenue
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Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4927**
Issue No:	**1**

Sample Details

Sample Number:	4310
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

NR

Approved Signatory: NR

Date of Issue: 11/05/2021

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 11/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q133	Hydrated Lime Content (%)	**5.0**			
	Source of Hydrated Lime	Wagners			

Released under PPL - DTMR

Comments:

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4864
Issue No: 2
This report replaces all previous issues of report No.: 4864

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4347
Client Reference: Lime Demand +4%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-105
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**19.9**			
	Achieved Compaction - Dry Density (t/m3)	**1.52**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	9.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.52**			
	Achieved Compacted Dry Density (t/m3)	**1.52**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**19.5**			
	Achieved Compaction Moisture Content (%)	**19.9**			
	Achieved Percentage of OMC (%)	**102**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.52 1.52 1.52			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.4 1.3 1.4			
	Mean UCS (MPa)	**1.4**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**2.0**			
	Capillary Rise (%)	**100**			

Released under NATA - EMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4862
Issue No: 2
This report replaces all previous issues of report No.: 4862

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4346
Client Reference: Lime Demand +2%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-105
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**21.4**			
	Achieved Compaction - Dry Density (t/m3)	**1.53**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.52**			
	Achieved Compacted Dry Density (t/m3)	**1.53**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**22.0**			
	Achieved Compaction Moisture Content (%)	**21.4**			
	Achieved Percentage of OMC (%)	**97**			
	Compaction Type	**Standard**			
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.54 1.53 1.53			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.5 2.4 2.2			
	Mean UCS (MPa)	**2.4**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**2.5**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4860
Issue No: 2
This report replaces all previous issues of report No.: 4860

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4345
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-105
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.9**			
	Achieved Compaction - Dry Density (t/m3)	**1.54**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	5.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.54**			
	Achieved Compacted Dry Density (t/m3)	**1.54**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**19.1**			
	Achieved Compaction Moisture Content (%)	**18.9**			
	Achieved Percentage of OMC (%)	**99**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.54 1.55 1.54			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.3 1.2 1.1			
	Mean UCS (MPa)	**1.2**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**1.0**			
	Capillary Rise (%)	**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
ACN: 614 194 900
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4926**
Issue No:	**1**

Sample Details

Sample Number:	4309
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

NR

Approved Signatory: NR

Date of Issue: 10/05/2021

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 10/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q133	Hydrated Lime Content (%)	**3.0**			
	Source of Hydrated Lime	Wagners			

Released under RTI - DTMR

Comments:

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4854
Issue No: 2
This report replaces all previous issues of report No.: 4854

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4342
Client Reference: Lime Demand +4%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-104
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**19.3**			
	Achieved Compaction - Dry Density (t/m3)	**1.59**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.58**			
	Achieved Compacted Dry Density (t/m3)	**1.59**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**19.6**			
	Achieved Compaction Moisture Content (%)	**19.3**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.59 1.59 1.59			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.9 1.9 1.8			
	Mean UCS (MPa)	**1.9**			
Q125D	Initial Height of Specimen (mm)	**114**			
	Rise Time (hrs)	**2.0**			
	Capillary Rise (%)	**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
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Email: superiorquarrytesting.com

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4852
Issue No: 2
This report replaces all previous issues of report No.: 4852

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4341
Client Reference: Lime Demand +2%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-104
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.0**			
	Achieved Compaction - Dry Density (t/m3)			**1.61**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.61**			
	Achieved Compacted Dry Density (t/m3)			**1.61**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**18.5**			
	Achieved Compaction Moisture Content (%)			**18**			
	Achieved Percentage of OMC (%)			**97**			
	Compaction Type						
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.62	1.61	1.62			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.3	0.9	1.5			
	Mean UCS (MPa)			**1.2**			
Q125D	Initial Height of Specimen (mm)			**114**			
	Rise Time (hrs)			**1.0**			
	Capillary Rise (%)			**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
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Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4850**
Issue No:	**2**

This report replaces all previous issues of report No.: 4850

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 24/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4340
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-104
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.3**			
	Achieved Compaction - Dry Density (t/m3)	**1.64**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.63**			
	Achieved Compacted Dry Density (t/m3)	**1.64**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**19.1**			
	Achieved Compaction Moisture Content (%)	**18.3**			
	Achieved Percentage of OMC (%)	**96**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.63 1.63 1.64			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.3 1.2 1.2			
	Mean UCS (MPa)	**1.2**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**0.5**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
ACN: 614 194 900
Address: Unit 4/189 Anzac Avenue
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Phone: NR
Email: NR@superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4925**
Issue No:	**1**

Sample Details

Sample Number:	4308
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-103
Lot No:	
Sampled By:	Submitted By Client

NR

Approved Signatory: NR

Date of Issue: 10/05/2021

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 10/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q133	Hydrated Lime Content (%)	**3.5**			
	Source of Hydrated Lime	Wagners			

Released under PPL - DTMR

Comments:

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4844
Issue No: 2
This report replaces all previous issues of report No.: 4844

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4337
Client Reference: Lime Demand +4%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-103
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.7**			
	Achieved Compaction - Dry Density (t/m3)	**1.61**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.5			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.61**			
	Achieved Compacted Dry Density (t/m3)	**1.61**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**18.7**			
	Achieved Compaction Moisture Content (%)	**18.7**			
	Achieved Percentage of OMC (%)	**100**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.62 1.61 1.61			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.7 1.4 1.6			
	Mean UCS (MPa)	**1.6**			
Q125D	Initial Height of Specimen (mm)	**115**			
	Rise Time (hrs)	**1.5**			
	Capillary Rise (%)	**100**			

Released under NATA-DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4842
Issue No: 2
This report replaces all previous issues of report No.: 4842

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4336
Client Reference: Lime Demand +2%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-103
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**19.4**			
	Achieved Compaction - Dry Density (t/m3)	**1.63**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	5.5			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.63**			
	Achieved Compacted Dry Density (t/m3)	**1.63**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**19.3**			
	Achieved Compaction Moisture Content (%)	**19.4**			
	Achieved Percentage of OMC (%)	**101**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.63 1.63 1.62			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.1 1.7 1.8			
	Mean UCS (MPa)	**1.9**			
Q125D	Initial Height of Specimen (mm)	**114**			
	Rise Time (hrs)	**1.5**			
	Capillary Rise (%)	**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added.

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
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Phone:
Email: superiorquarrytesting.com

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4840
Issue No: 2
This report replaces all previous issues of report No.: 4840

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4335
Client Reference: Lime Demand
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-103
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**17.4**			
	Achieved Compaction - Dry Density (t/m3)	**1.64**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.5			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.65**			
	Achieved Compacted Dry Density (t/m3)	**1.64**			
	Achieved Relative Compaction (%)	**96.5**			
	Target Compaction Moisture Content (%)	**17.5**			
	Achieved Compaction Moisture Content (%)	**17.4**			
	Achieved Percentage of OMC (%)	**99**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.64 1.65 1.65			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.0 1.0 1.0			
	Mean UCS (MPa)	**1.0**			
Q125D	Initial Height of Specimen (mm)	**115**			
	Rise Time (hrs)	**1.0**			
	Capillary Rise (%)	**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
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Address: Unit 4/189 Anzac Avenue
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Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4924**
Issue No:	**1**

Sample Details

Sample Number:	4307
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

NR

Approved Signatory: NR

Date of Issue: 10/05/2021

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 10/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q133	Hydrated Lime Content (%)	**3.5**			
	Source of Hydrated Lime	Wagners			

Released under PPL - DTMR

Comments:

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
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Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4834
Issue No: 2
This report replaces all previous issues of report No.: 4834

NATA Accredited Laboratory Number: NR
ACCREDITED FOR TECHNICAL COMPETENCE
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4332
Client Reference: Lime Demand +4%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-102
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**16.8**			
	Achieved Compaction - Dry Density (t/m3)	**1.65**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	7.5			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.64**			
	Achieved Compacted Dry Density (t/m3)	**1.65**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**17.0**			
	Achieved Compaction Moisture Content (%)	**16.8**			
	Achieved Percentage of OMC (%)	**99**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.65 1.65 1.65			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.9 1.7 1.8			
	Mean UCS (MPa)	**1.8**			
Q125D	Initial Height of Specimen (mm)	**114**			
	Rise Time (hrs)	**2.0**			
	Capillary Rise (%)	**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4832**
Issue No:	**2**

This report replaces all previous issues of report No.: 4832

NATA Accredited Laboratory Numbe NR

NR

Approved Signatory: NR

Date of Issue: 24/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4331
Client Reference:	Lime Demand +2%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**16.8**			
	Achieved Compaction - Dry Density (t/m3)			**1.66**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			5.5			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method			Air Cured Sealed			
	Target Compacted Dry Density (t/m3)			**1.65**			
	Achieved Compacted Dry Density (t/m3)			**1.66**			
	Achieved Relative Compaction (%)			**97.5**			
	Target Compaction Moisture Content (%)			**17.1**			
	Achieved Compaction Moisture Content (%)			**16.8**			
	Achieved Percentage of OMC (%)			**98**			
	Compaction Type						
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.66	1.65	1.65			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	2.0	1.8	1.9			
	Mean UCS (MPa)			**1.9**			
Q125D	Initial Height of Specimen (mm)			**114**			
	Rise Time (hrs)			**1.5**			
	Capillary Rise (%)			**100**			

Released under NATA - DTMR

Comments:
Reissue Reason: Q125D Results added

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4830**
Issue No:	**2**

This report replaces all previous issues of report No.: 4830

NATA Accredited Laboratory Number NR

NR

Approved Signatory NR

Date of Issue: 24/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4330
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-102
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**16.7**			
	Achieved Compaction - Dry Density (t/m3)	**1.68**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	3.5			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method				
	Target Compacted Dry Density (t/m3)	**1.67**			
	Achieved Compacted Dry Density (t/m3)	**1.68**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**17.0**			
	Achieved Compaction Moisture Content (%)	**16.7**			
	Achieved Percentage of OMC (%)	**98**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.68 1.67 1.68			
	Specimen Capped	No No No			
	UCS Results (Mpa)	1.8 1.6 1.8			
	Mean UCS (MPa)	**1.7**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**1.5**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added.

Material Test Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
ACN: 614 194 900
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR @superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4923**
Issue No:	**1**

Sample Details

Sample Number:	4306
Client Reference:	
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

NATA Accredited Laboratory Number NR
NR
Approved Signatory: NR
Date of Issue: 10/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 10/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
AS4489.6.1	Available Lime Ca(OH)2 (%)	**90.40**			
	Lime Type	Hydrated			
	Supplier	Wagners			
Q133	Hydrated Lime Content (%)	**4.0**			
	Source of Hydrated Lime	Wagners			

Released under PIT - DTMR

Comments:

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone: NR
Email: NR superiorquarrytesting.com

Unconfined Compressive Strength Report

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No: 4824
Issue No: 2
This report replaces all previous issues of report No.: 4824

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4327
Client Reference:	Lime Demand +4%
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.8**			
	Achieved Compaction - Dry Density (t/m3)	**1.61**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	8.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method				
	Target Compacted Dry Density (t/m3)	**1.61**			
	Achieved Compacted Dry Density (t/m3)	**1.61**			
	Achieved Relative Compaction (%)	**97**			
	Target Compaction Moisture Content (%)	**18.8**			
	Achieved Compaction Moisture Content (%)	**18.8**			
	Achieved Percentage of OMC (%)	**100**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.61 1.61 1.61			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.1 2.0 2.0			
	Mean UCS (MPa)	**2.0**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**2.0**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Unconfined Compressive Strength Report

Client: Construction Testing & Quality Services
14 Sandalwood Avenue
Dalby Qld 4405
Project: Daandine Nandi Road

Report No: 4822
Issue No: 2
This report replaces all previous issues of report No.: 4822

NATA Accredited Laboratory Number: NR
NR
Approved Signatory: NR
Date of Issue: 24/05/2021
Accredited for compliance with ISO/IEC 17025 - Testing
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number: 4326
Client Reference: Lime Demand +2%
Date Sampled: 9/3/2021
Date Received: 10/3/2021
Material Source: -
Material Type: Subgrade Material
Specification: -
Sampling Method: Tested as Received
Sampled From: Depth 500-1000mm
Location: BH-101
Lot No:
Sampled By: Submitted By Client

Report Notes:
1. The results in this report relate only to the items tested.
2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results			Min	Max	Tar
Q251A	Sample Type			Laboratory Mixed			
	Compaction Moisture Content (%)			**18.3**			
	Achieved Compaction - Dry Density (t/m3)			**1.61**			
Q115	Stabilising Agent Source			Wagners			
	Stabilising Agent Type			Hydrated Lime			
	Target Stabilising Agent Quantity (%)			6.0			
	ATIC Registration Number			Not Available			
	Curing Duration (days)			28			
	Curing Temperature (Deg C)			23 +/- 2			
	Q135B Curing Method						
	Target Compacted Dry Density (t/m3)			**1.61**			
	Achieved Compacted Dry Density (t/m3)			**1.61**			
	Achieved Relative Compaction (%)			**97**			
	Target Compaction Moisture Content (%)			**18.2**			
	Achieved Compaction Moisture Content (%)			**18.3**			
	Achieved Percentage of OMC (%)			**101**			
	Compaction Type						
	Specimen Number	1	2	3			
	Dry Density (t/m3)	1.61	1.61	1.61			
	Specimen Capped	No	No	No			
	UCS Results (Mpa)	1.8	1.7	1.6			
	Mean UCS (MPa)			**1.7**			
Q125D	Initial Height of Specimen (mm)			**113**			
	Rise Time (hrs)			**1.0**			
	Capillary Rise (%)			**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Q125D Results added.

Unconfined Compressive Strength Report

Superior Quarry Testing Pty Ltd
ABN: 49 103 442 402
Address: Unit 4/189 Anzac Avenue
Toowoomba Qld 4350
Phone:
Email: superiorquarrytesting.com

Client:	Construction Testing & Quality Services
	14 Sandalwood Avenue
	Dalby Qld 4405
Project:	Daandine Nandi Road

Report No:	**4820**
Issue No:	**2**

This report replaces all previous issues of report No.: 4820

NATA Accredited Laboratory Number: NR

NR

Approved Signatory: NR

Date of Issue: 24/05/2021

Accredited for compliance with ISO/IEC 17025 - Testing

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Number:	4325
Client Reference:	Lime Demand
Date Sampled:	9/3/2021
Date Received:	10/3/2021
Material Source:	-
Material Type:	Subgrade Material
Specification:	-
Sampling Method:	Tested as Received
Sampled From:	Depth 500-1000mm
Location:	BH-101
Lot No:	
Sampled By:	Submitted By Client

Report Notes:

1. The results in this report relate only to the items tested.

2.The results in this test report apply to the sample as received. Sample information was provided by the client.

Testing Completed: 24/05/2021

Test Results

Test Method	Details	Results	Min	Max	Tar
Q251A	Sample Type	Laboratory Mixed			
	Compaction Moisture Content (%)	**18.4**			
	Achieved Compaction - Dry Density (t/m3)	**1.64**			
Q115	Stabilising Agent Source	Wagners			
	Stabilising Agent Type	Hydrated Lime			
	Target Stabilising Agent Quantity (%)	4.0			
	ATIC Registration Number	Not Available			
	Curing Duration (days)	28			
	Curing Temperature (Deg C)	23 +/- 2			
	Q135B Curing Method	Air Cured Sealed			
	Target Compacted Dry Density (t/m3)	**1.64**			
	Achieved Compacted Dry Density (t/m3)	**1.64**			
	Achieved Relative Compaction (%)	**97.5**			
	Target Compaction Moisture Content (%)	**18.5**			
	Achieved Compaction Moisture Content (%)	**18.4**			
	Achieved Percentage of OMC (%)	**99**			
	Compaction Type				
	Specimen Number	1 2 3			
	Dry Density (t/m3)	1.65 1.64 1.64			
	Specimen Capped	No No No			
	UCS Results (Mpa)	2.1 1.7 2.0			
	Mean UCS (MPa)	**1.9**			
Q125D	Initial Height of Specimen (mm)	**113**			
	Rise Time (hrs)	**1.0**			
	Capillary Rise (%)	**100**			

Released under NATA DTMR

Comments:
Reissue Reason: Capillary Rise result added

Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Report No: BRIS21S-01067-1
Issue No: 1

Material Test Report

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

NR

Approved Signatory: NR
(Technician)
NATA Accredited Laboratory Number: NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01067 / BH101
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.02	
Date Tested		8/04/2021	
Available Lime CaO (%)	AS 4489.6.1		
Available Lime Ca(OH)2 (%)		93.10	
Date Tested		12/04/2021	
Average Organic Content (%)	Q120B	3.30	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		05.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagner	
Type of Hydrated Lime		hydrated	
Date Tested		12/04/2021	

Comments

Results relate only to the items tested or sampled.

Released under RTI - DNRME

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Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Material Test Report

Report No: BRIS21S-01068-1
Issue No: 1

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

NR

Approved Signatory (Technician): NR
NATA Accredited Laboratory Number: NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01068 / BH102
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.01	
Date Tested		8/04/2021	
Average Organic Content (%)	Q120B	2.54	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		05.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagner	
Type of Hydrated Lime		Hydrated	
Date Tested		12/04/2021	

Comments

Results relate only to the items tested or sampled.

Released under RTI - DNRME

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Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Report No: BRIS21S-01069-1
Issue No: 1

Material Test Report

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

NR

Approved Signatory: NR
(Technician)
NATA Accredited Laboratory Number: NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01069 / BH103
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.01	
Date Tested		16/04/2021	
Average Organic Content (%)	Q120B	3.32	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		04.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagners	
Type of Hydrated Lime		Hydrated	
Date Tested		13/04/2021	

Comments

Results relate only to the items tested or sampled.

Released under RTI - DNRME

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Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Report No: BRIS21S-01070-1
Issue No: 1

Material Test Report

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

NR

Approved Signatory NR
(Technician)
NATA Accredited Laboratory Number NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01070 / BH104
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.01	
Date Tested		13/04/2021	
Average Organic Content (%)	Q120B	3.43	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		04.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagners	
Type of Hydrated Lime		Hydrated	
Date Tested		13/04/2021	

Comments

Results relate only to the items tested or sampled.

Released under RTI - DNRME

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Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Material Test Report

Report No: BRIS21S-01071-1
Issue No: 1

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

NR

Approved Signatory (Technician) NR
NATA Accredited Laboratory Number: NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01071 / BH105
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.01	
Date Tested		16/04/2021	
Average Organic Content (%)	Q120B	2.12	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		05.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagners	
Type of Hydrated Lime		Hydrated	
Date Tested		14/04/2021	

Comments

Results relate only to the items tested or sampled.

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Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Report No: BRIS21S-01072-1
Issue No: 1

Material Test Report

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

NR

Approved Signatory: NR
(Technician)
NATA Accredited Laboratory Number: NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01072 / BH106
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.02	
Date Tested		13/04/2021	
Average Organic Content (%)	Q120B	4.81	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		05.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagners	
Type of Hydrated Lime		Hydrated	
Date Tested		22/04/2021	

Comments

Results relate only to the items tested or sampled.

Released under RTI - DNRME

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Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Material Test Report

Report No: BRIS21S-01073-2
Issue No: 1

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

NR

Approved Signatory (Technician): NR
NATA Accredited Laboratory Number: NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01073 / BH107
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.04	
Date Tested		15/04/2021	
Average Organic Content (%)	Q120B	4.77	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		03.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagners	
Type of Hydrated Lime		Hydrated	
Date Tested		15/04/2021	

Comments

Results relate only to the items tested or sampled.

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Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Material Test Report

Report No: BRIS21S-01074-2
Issue No: 1

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

NR

Approved Signatory (Technician): NR
NATA Accredited Laboratory Number: NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01074 / BH108
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.01	
Date Tested		15/04/2021	
Average Organic Content (%)	Q120B	4.30	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		05.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagners	
Type of Hydrated Lime		Hydrated	
Date Tested		15/04/2021	

Comments

Results relate only to the items tested or sampled.

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Brisbane Laboratory

Coffey Testing Pty Ltd
ABN 92 114 364 046
86A Yarraman Place
Virginia QLD 4014

Phone: NR

Report No: BRIS21S-01075-1
Issue No: 1

Material Test Report

Client: Construction Testing and Quality Services
562 Dalby Cecil Plains Road
Dalby QLD 4405

Principal:
Project No.: TESTBRIS00016AA
Project Name: QC Testing
Lot No.: **TRN:** PO-0095

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers

NR

Approved Signatory NR
(Technician)
NATA Accredited Laboratory Number NR
Date of Issue: 22/04/2021

Sample Details

Sample ID / Client ID: BRIS21S-01075 / BH109
Date Sampled:
Source: Daandine Nandi Road Pavement Investigation
Material: Soil
Specification:
Sampling Method: Submitted by client
Project Location: Daandine Nandi Road Pavement Investigation
Sample Location:

Test Results

Description	Method	Result	Limits
Sulfate Content - Soil (%)	AS 1289.4.2.1	0.02	
Date Tested		16/04/2021	
Average Organic Content (%)	Q120B	4.43	
Date Tested		19/04/2021	
Available Lime Content (%)	Q133	93.1	
LME DEMAND (%)		05.0	
Lime required to Saturate (%)			
Source of Hydrated Lime		Wagners	
Type of Hydrated Lime		Hydrated	
Date Tested		16/04/2021	

Comments

Results relate only to the items tested or sampled.

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Australian Laboratory Services Pty. Ltd.
32 Shand Street
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Brisbane QLD 4053
Phone: +61 7 3243 7222 Fax: +61 7 3243 7218
www.alsglobal.com/geochemistry

To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 6-MAY-2021
Account: ALSENV

CERTIFICATE BR21092605

Project: EB2109697

P.O. No.: Fe-VOL05

This report is for 9 samples of Pulp submitted to our lab in Brisbane, QLD, Australia on 16-APR-2021.

The following have access to data associated with this certificate:

SUB RESULTS -BRIS		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
LOG-22	Sample login - Rcd w/o BarCode
LEV-01	Waste Disposal Levy

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
Fe-VOL05	FeO (Ferrous Iron)	

Released under RTI - DEWR

This is the Final Report and supersedes any preliminary report with this certificate number.Results apply to samples as submitted.All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Signature:

NR

NR Brisbane Laboratory Manager

Australian Laboratory Services Pty. Ltd.
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www.alsglobal.com/geochemistry

To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Project: EB2109697

CERTIFICATE OF ANALYSIS BR21092605

Sample Description	Method Analyte Units LOD	Fe-VOL05 FeO % 0.01
BH-101		0.38
BH-102		0.38
BH-103		0.39
BH-104		0.43
BH-105		0.56
BH-106		0.44
BH-107		0.54
BH-108		0.41
BH-109		0.41

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***** See Appendix Page for comments regarding this certificate *****

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To: ALS ENVIRONMENTAL
32 SHAND STREET
STAFFORD QLD 4053

Finalized Date: 6-MAY-2021
Account: ALSENV

Project: EB2109697

CERTIFICATE OF ANALYSIS BR21092605

CERTIFICATE COMMENTS

LABORATORY ADDRESSES

Applies to Method:

Processed at ALS Brisbane located at 32 Shand Street, Stafford, Brisbane, QLD, Australia. Processed at ALS Brisbane Sample Preparation at 23 Pineapple Street, Zillmere, QLD, 4034, Australia

Fe-VOL05	LEV-01	LOG-22

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Appendix C
Site Photograph

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Photograph 1 – BH-101



Photograph 2– BH-101

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Photograph 3 – BH-102

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Released under RTI - DTMR

Photograph 4– BH-102


Released under RTI - DTMR

Photograph 5 – BH-103



Photograph 6 – BH-103

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Photograph 7– BH-104

Released under RTI - DTMP



Photograph 8– BH-104

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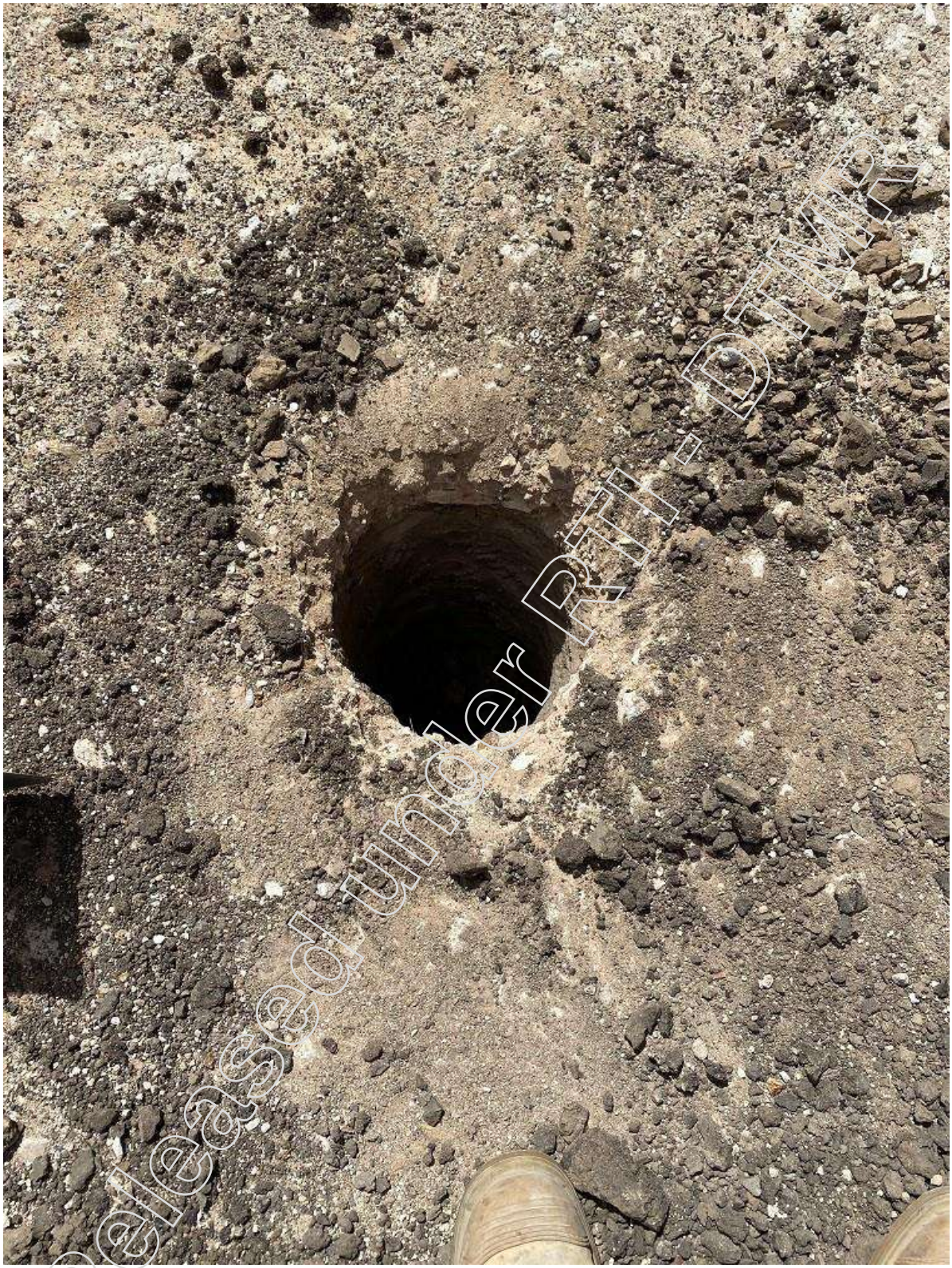
Photograph 9– BH-105

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Photograph 10 – BH-105

Released under RTI - DTMR



Photograph 11 – BH-106

Released under RTI - DTMR



Photograph 12 – BH-106

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Report under RTI - DTMR

Photograph 13 – BH-107



Photograph 14 – BH-107

Released under RTI - DTMR



Photograph 15 – BH-107

Released under RTI - DTMR



Photograph 16 – BH-108

Released under RTI - DTMR



Photograph 17 – BH-109

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Photograph 18 – BH-109

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Appendix B – Circly Outputs

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CIRCLY - Version 7.0 (18 March 2019)

Layer no. 8 is INCLUDED in max. CDF calculation
Job Title: P10646 Daandine - Nandi Rd - Section 1 - Lime Stab with Unbound Pavement

Design Method: Austroads 2017

NDT (cumulative heavy vehicle axle groups over design period): 4.29E+05

Traffic Load Distribution:

ID: 3401
Name: Daandine - Nandi Rd - 2019 Traffic Count with Presumptive WIM
ESA/HVAG: 0.845

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA750-Full	ESA750-Full	Vertical Force	92.1	0.75	0.00
2	SAST53	SAST53	Vertical Force	102.4	0.80	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA750-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA750-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA750-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA750-Full	1	1965.0	0.0	1.00E+00	0.00
1	SAST53	1	0.0	0.0	1.00E+00	0.00
2	SAST53	1	2130.0	0.0	1.00E+00	0.00

Details of Layered System:

ID: P10646_S1_20Y_UB_LS Title: Daandine - Nandi Rd S1_20Y_CBR1.5_Lime Stabilised Subgrade with Unbound

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Gran_350	Aniso.	3.50E+02	0.35	2.59E+02	1.75E+02	0.35
2	rough	Gran_250	Aniso.	2.50E+02	0.35	1.85E+02	1.25E+02	0.35
3	rough	Lime Stab 200 MPa	Aniso.	2.00E+02	0.45	1.38E+02	1.00E+02	0.45
4	rough	Lime Stab 119 MPa	Aniso.	1.19E+02	0.45	8.21E+01	5.95E+01	0.45
5	rough	Lime Stab 71 MPa	Aniso.	7.10E+01	0.45	4.90E+01	3.55E+01	0.45
6	rough	Lime Stab 42 MPa	Aniso.	4.20E+01	0.45	2.90E+01	2.10E+01	0.45
7	rough	Lime Stab 25 MPa	Aniso.	2.50E+01	0.45	1.72E+01	1.25E+01	0.45
8	rough	Sub_CBR1.5	Aniso.	1.50E+01	0.45	1.03E+01	7.50E+00	0.45

Performance Relationships:

Layer No.	Location	Material ID	Component	Perform. Constant	Perform. Exponent	Shift Factor
8	top	Sub_CBR1.5	EZZ	0.009150	7.000	

Reliability Factors:
Project Reliability: Austroads 90%

Layer No.	Reliability Factor	Material Type
8	1.00	Subgrade (Austroads 2017)

Details of Layers to be sublayered:
Layer no. 1: Austroads (2004) sublayering
Layer no. 2: Austroads (2004) sublayering

Automatic layer thickness design:
Layer number to be designed: 2
Minimum thickness: 0
Maximum thickness: 5000

Strains:

Layer No.	Thickness	Material ID	Axle	Unitless Strain
8	0.00	Sub_CBR1.5		
			SADT(80):	1.467E-03

Results:

Layer No.	Thickness	Material ID	Axle Group	CDF
1	150.00	Gran_350		n/a
2	139.27	Gran_250		n/a
3	60.00	Lime Stab 200 MPa		n/a
4	60.00	Lime Stab 119 MPa		n/a
5	60.00	Lime Stab 71 MPa		n/a
6	60.00	Lime Stab 42 MPa		n/a

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7	60.00	Lime Stab 25 MPa		n/a
8	0.00	Sub_CBR1.5	Total:	9.891E-01

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CIRCLY - Version 7.0 (18 March 2019)

Layer no. 8 is INCLUDED in max. CDF calculation
Job Title: P10646 Daandine - Nandi Rd - Section 3 - Lime Stab with Unbound Pavement

Design Method: Austroads 2017

NDT (cumulative heavy vehicle axle groups over design period): 8.40E+05

Traffic Load Distribution:

ID: 3401
Name: Daandine - Nandi Rd - 2019 Traffic Count with Presumptive WIM
ESA/HVAG: 0.845

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA750-Full	ESA750-Full	Vertical Force	92.1	0.75	0.00
2	SAST53	SAST53	Vertical Force	102.4	0.80	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA750-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA750-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA750-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA750-Full	1	1965.0	0.0	1.00E+00	0.00
1	SAST53	1	0.0	0.0	1.00E+00	0.00
2	SAST53	1	2130.0	0.0	1.00E+00	0.00

Details of Layered System:

ID: P10646_S3_20Y_UB_LS Title: Daandine - Nandi Rd S3_20Y_CBR1.5_Lime Stabilised Subgrade with Unbound

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Gran_350	Aniso.	3.50E+02	0.35	2.59E+02	1.75E+02	0.35
2	rough	Gran_250	Aniso.	2.50E+02	0.35	1.85E+02	1.25E+02	0.35
3	rough	Lime Stab 200 MPa	Aniso.	2.00E+02	0.45	1.38E+02	1.00E+02	0.45
4	rough	Lime Stab 119 MPa	Aniso.	1.19E+02	0.45	8.21E+01	5.95E+01	0.45
5	rough	Lime Stab 71 MPa	Aniso.	7.10E+01	0.45	4.90E+01	3.55E+01	0.45
6	rough	Lime Stab 42 MPa	Aniso.	4.20E+01	0.45	2.90E+01	2.10E+01	0.45
7	rough	Lime Stab 25 MPa	Aniso.	2.50E+01	0.45	1.72E+01	1.25E+01	0.45
8	rough	Sub_CBR1.5	Aniso.	1.50E+01	0.45	1.03E+01	7.50E+00	0.45

Performance Relationships:

Layer No.	Location	Material ID	Component	Perform. Constant	Perform. Exponent	Shift Factor
8	top	Sub_CBR1.5	EZZ	0.009150	7.000	

Reliability Factors:
Project Reliability: Austroads 90%

Layer No.	Reliability Factor	Material Type
8	1.00	Subgrade (Austroads 2017)

Details of Layers to be sublayered:
Layer no. 1: Austroads (2004) sublayering
Layer no. 2: Austroads (2004) sublayering

Automatic layer thickness design:
Layer number to be designed: 2
Minimum thickness: 0
Maximum thickness: 5000

Strains:

Layer No.	Thickness	Material ID	Axle	Unitless Strain
8	0.00	Sub_CBR1.5		
			SADT(80):	1.335E-03

Results:

Layer No.	Thickness	Material ID	Axle Group	CDF
1	150.00	Gran_350		n/a
2	169.49	Gran_250		n/a
3	60.00	Lime Stab 200 MPa		n/a
4	60.00	Lime Stab 119 MPa		n/a
5	60.00	Lime Stab 71 MPa		n/a
6	60.00	Lime Stab 42 MPa		n/a

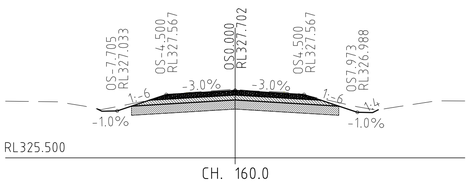
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7	60.00	Lime Stab 25 MPa		n/a
8	0.00	Sub_CBR1.5	Total:	1.000E+00

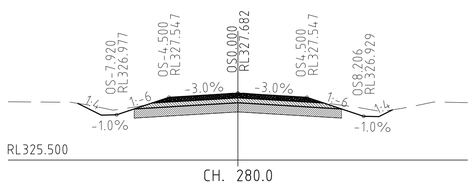
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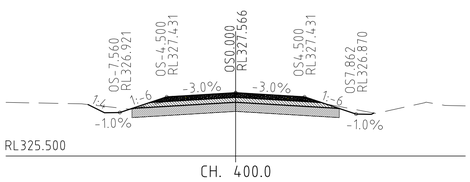
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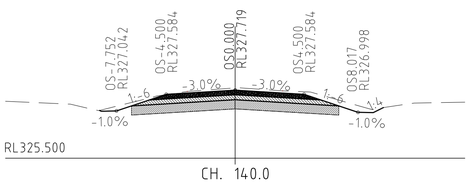
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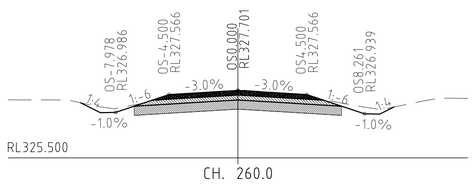
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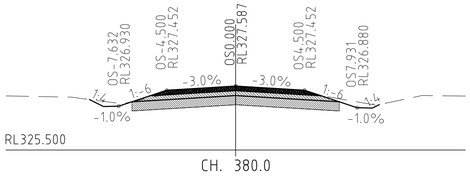
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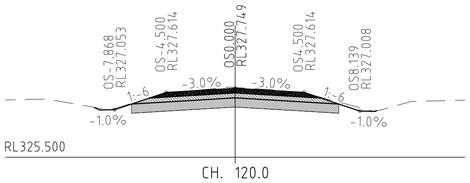
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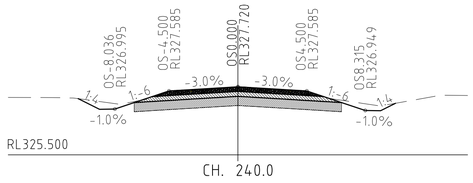
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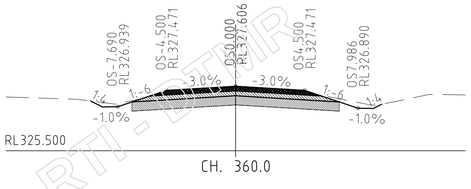
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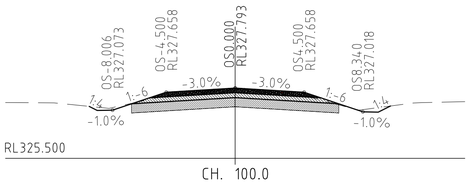
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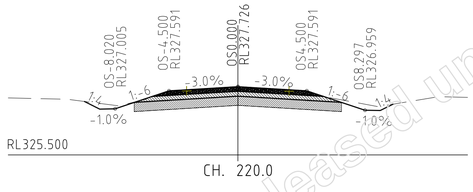
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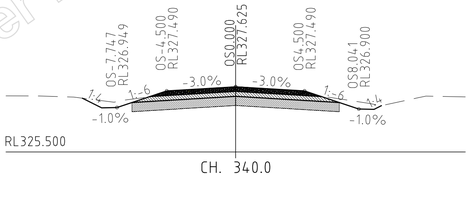
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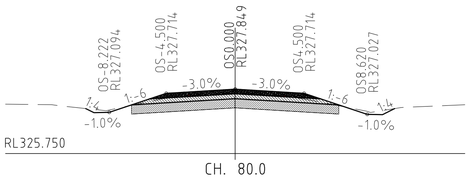
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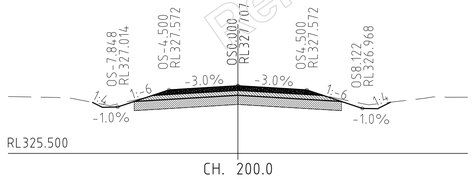
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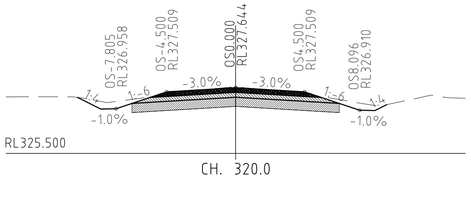
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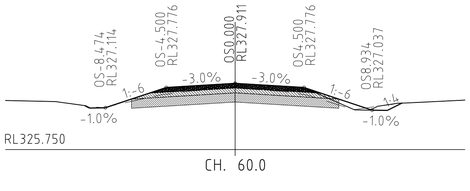
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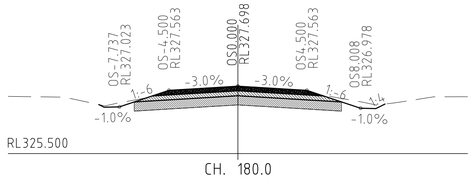
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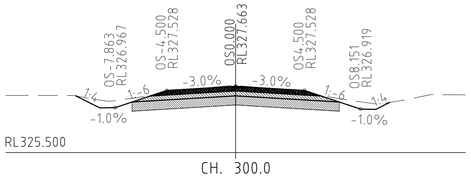
CH. 320.0



CH. 60.0



CH. 180.0



CH. 300.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

NR

Date: 03.06.21

STATUS FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C140

SITE S00

PLANT B01

SECURITY CLASSIFICATION RESTRICTED

DRAWING No. S00B01-ARW-CIV-CRS-00034

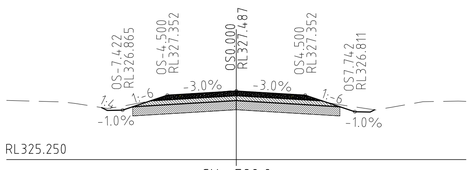
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 1 OF 11

SCALE AS SHOWN

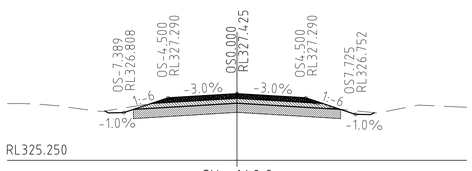
REV 0 A1

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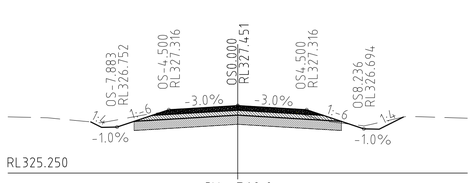
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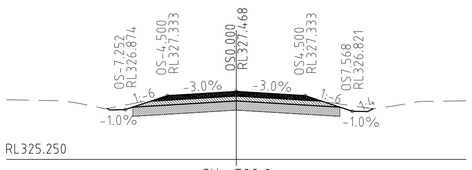
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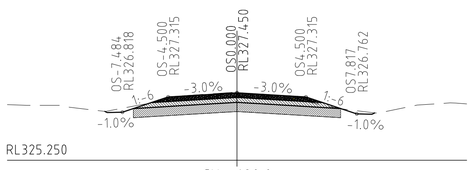
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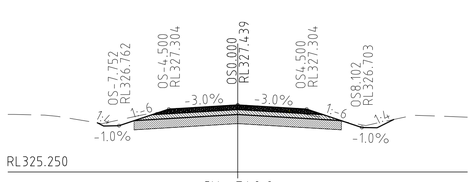
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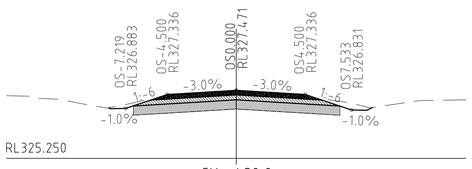
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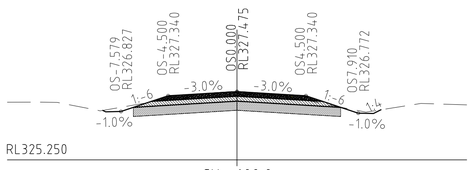
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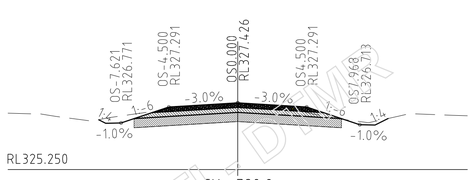
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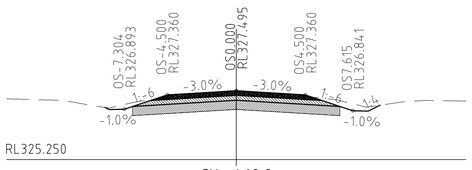
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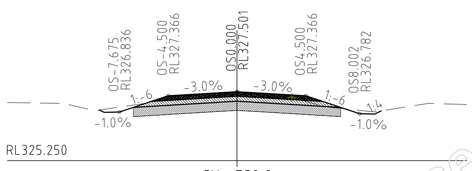
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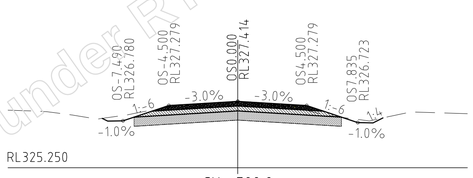
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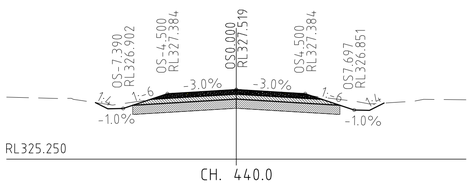
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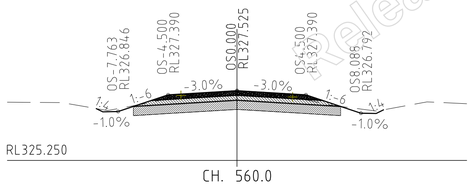
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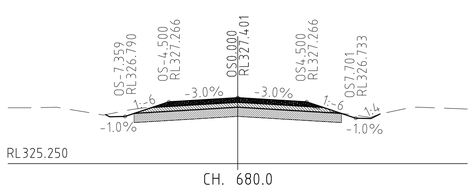
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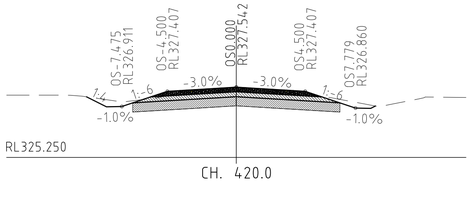
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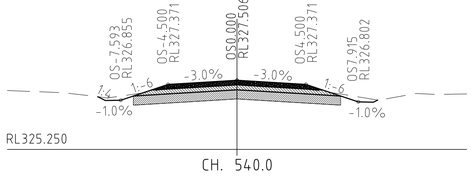
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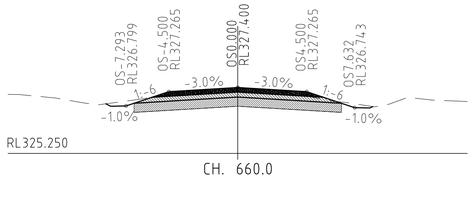
CH. 680.0



CH. 420.0



CH. 540.0



CH. 660.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11							
S00B01-ARW-CIV-CRS-00034	CROSS SECTIONS SHEET 1 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION NR

Date: 03.06.21

STATUS FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C141

SITE S00

PLANT B01

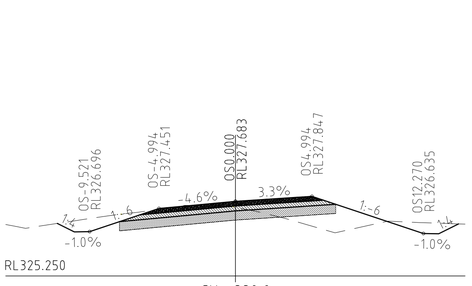
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 2 OF 11

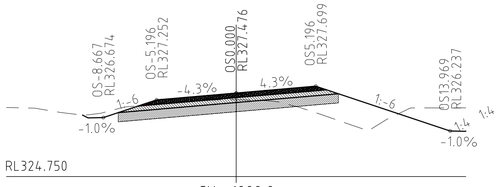
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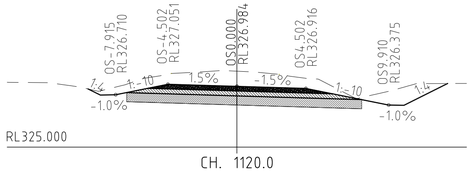
REV 0 A1



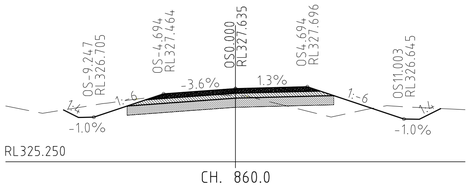
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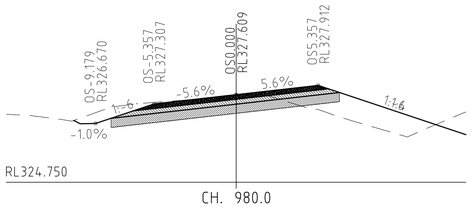
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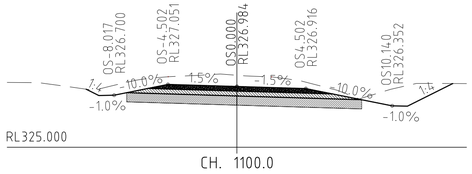
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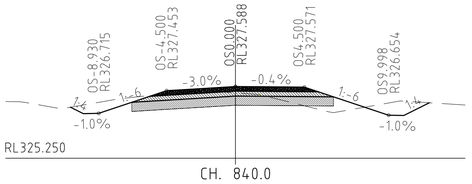
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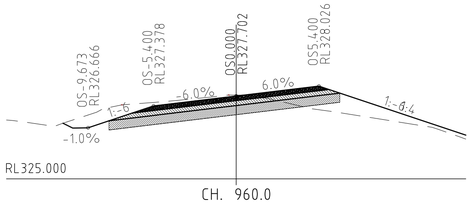
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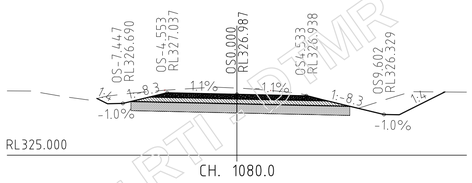
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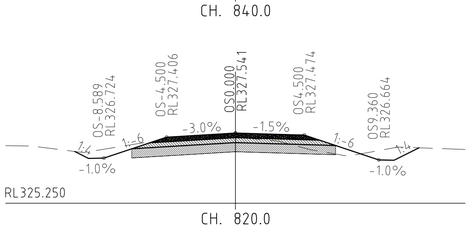
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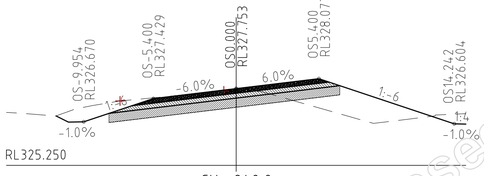
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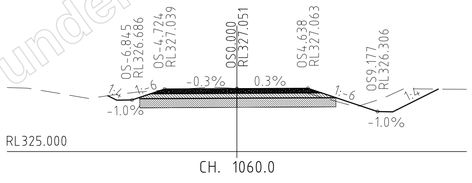
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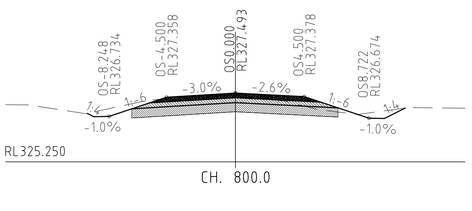
CH. 820.0



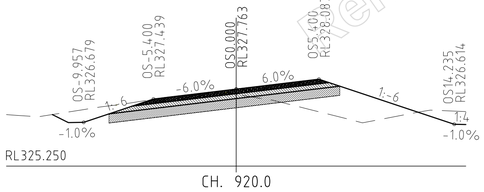
CH. 940.0



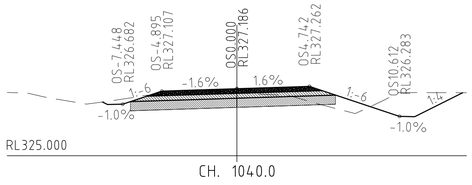
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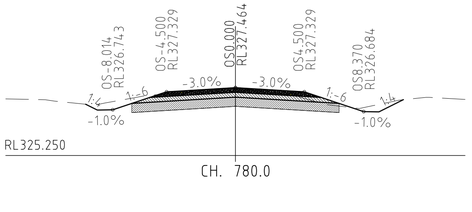
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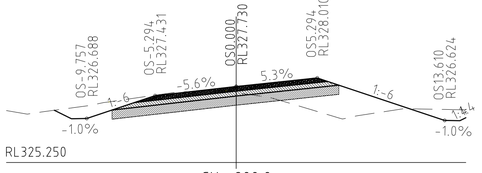
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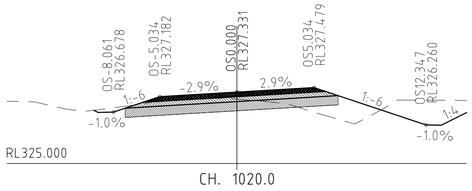
CH. 1040.0



CH. 780.0



CH. 900.0



CH. 1020.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11							
S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION
NR
Date: 03.06.21

STATUS
FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

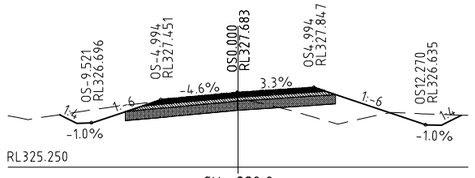
CONTRACTOR DWG No.
201237 C142

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

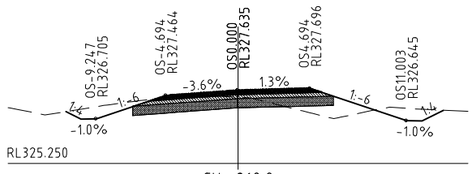
SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 3 OF 11

DRAWING No. S00B01-ARW-CIV-CRS-00036
SCALE AS SHOWN
REV 0
A1

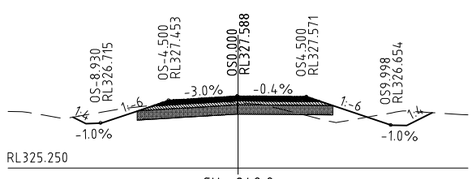
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SCALE 1:100m (A1) (VERT)



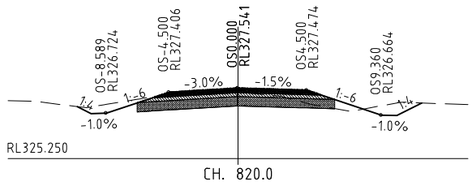
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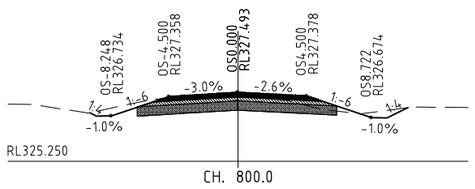
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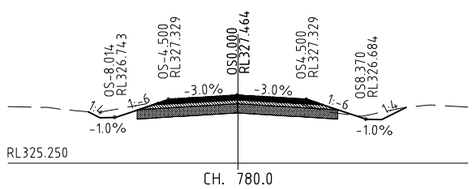
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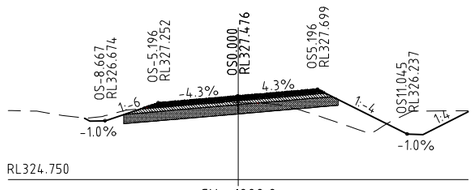
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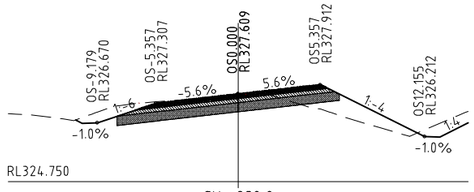
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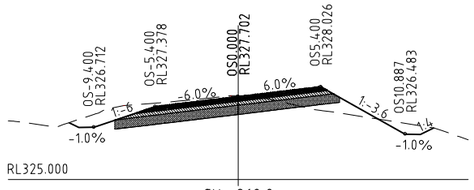
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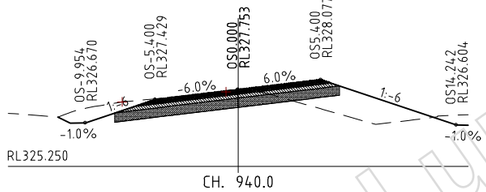
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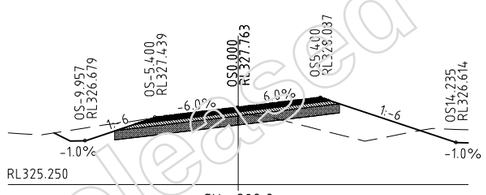
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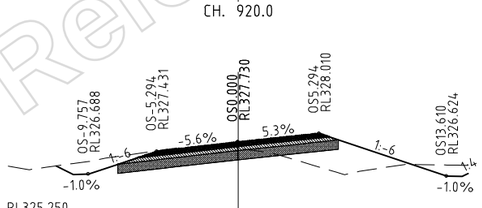
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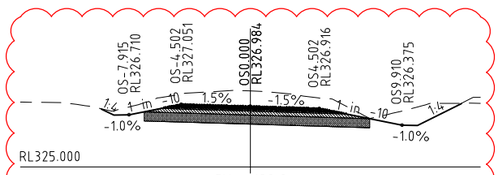
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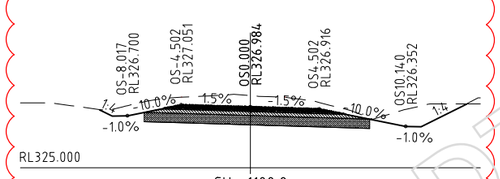
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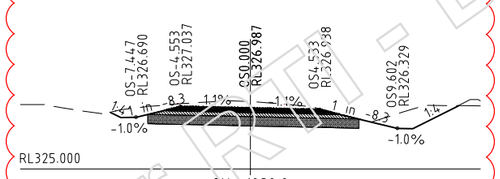
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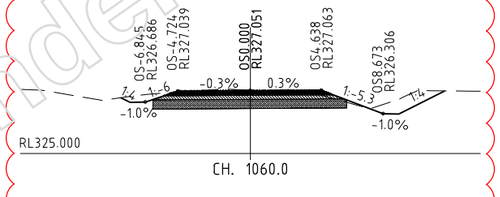
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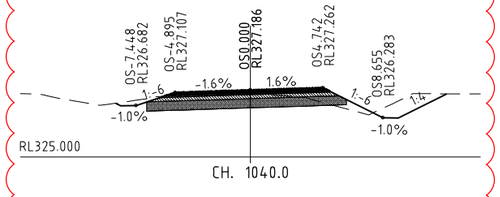
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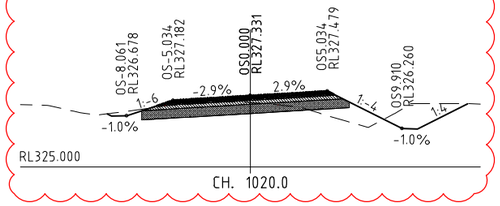
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CH. 1060.0



CH. 1040.0



CH. 1020.0

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4 2 0 4 8 12 16 20m
SCALE 1:200m (A1) (HOR)
2 1 0 2 4 6 8 10m
SCALE 1:100m (A1) (VERT)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		3	08.09.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		2	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

NR

RPEQ CERTIFICATION

NR

Date: 08.09.22

STATUS FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C142

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

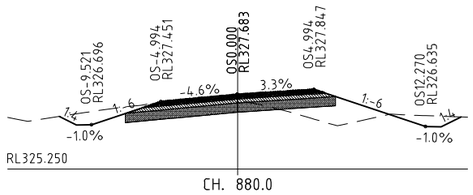
SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 3 OF 11

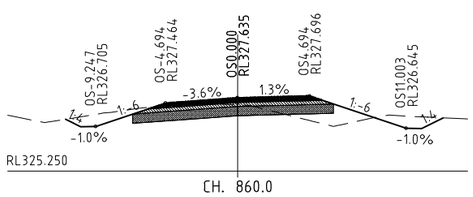
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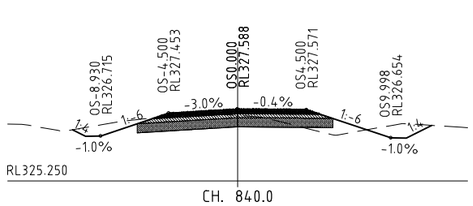
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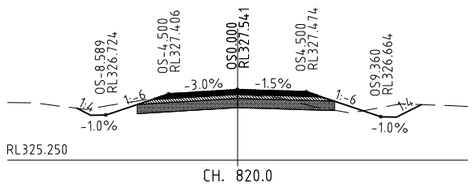
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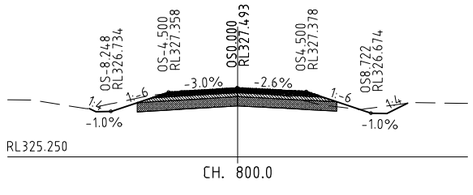
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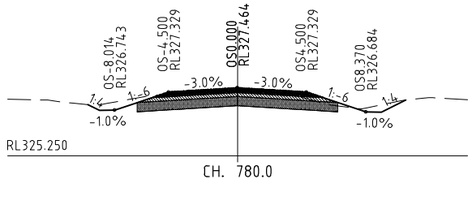


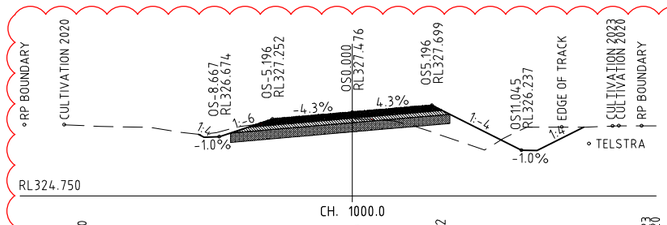


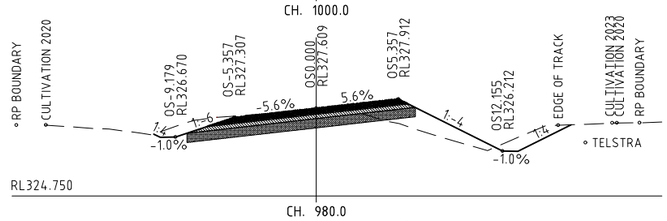


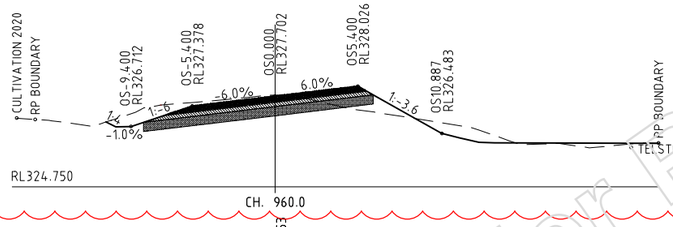


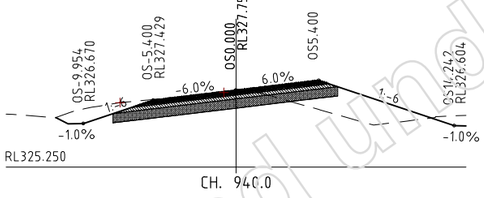


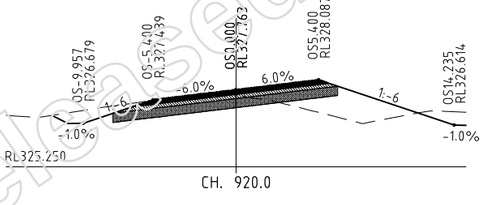


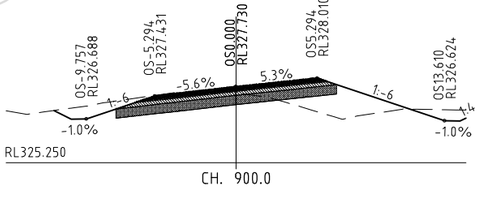


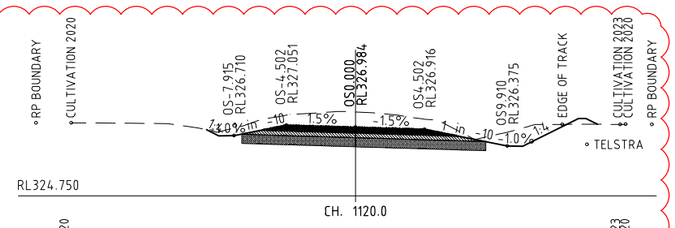


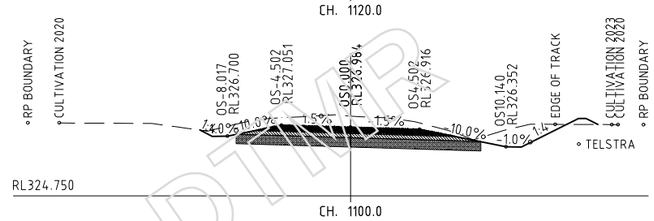


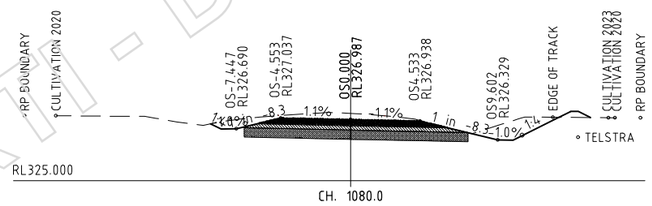


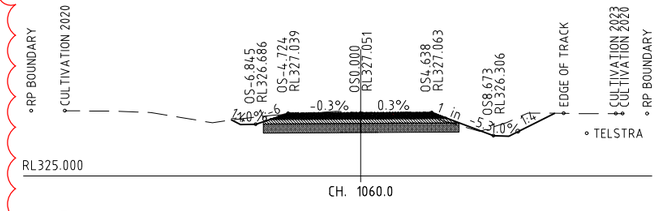


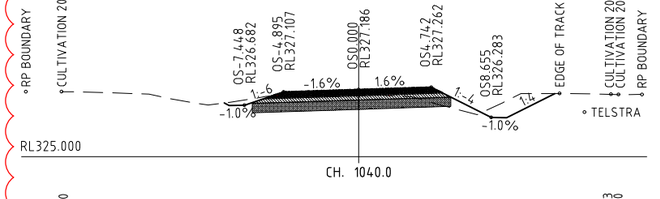


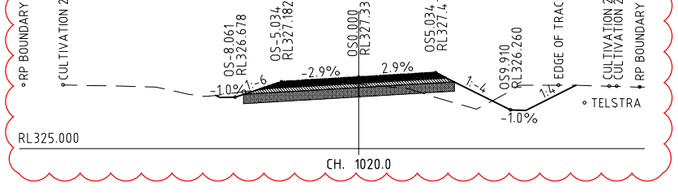












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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		4	01.02.23	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		3	08.09.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
		2	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00037	CROSS SECTIONS SHEET 4 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00035	CROSS SECTIONS SHEET 2 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DAT-00050	LOCALITY SHEET 1 OF 6	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

NR

RPEQ CERTIFICATION

NR

Date: 01.02.23

STATUS

FOR CONSTRUCTION

brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

CONTRACTOR DWG No. 201237 C142

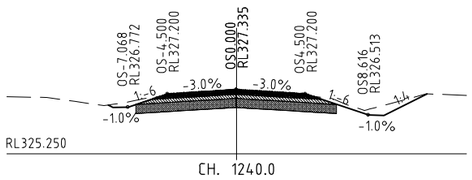
SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED
DRAWING No. S00B01-ARW-CIV-CRS-00036

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 3 OF 11

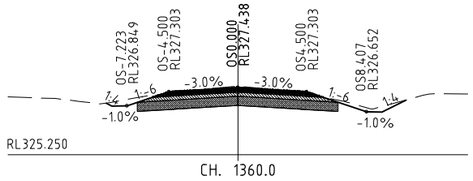
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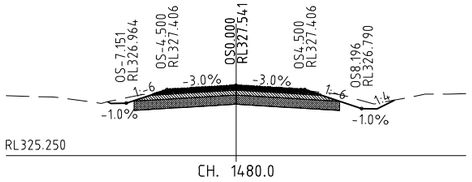
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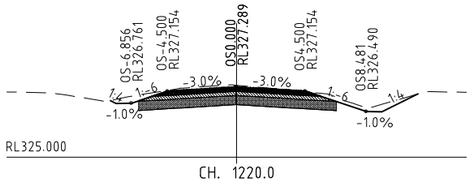
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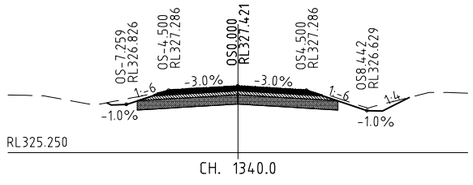
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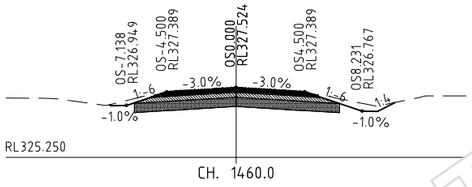
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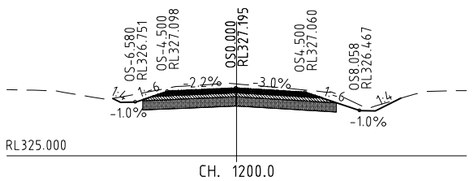
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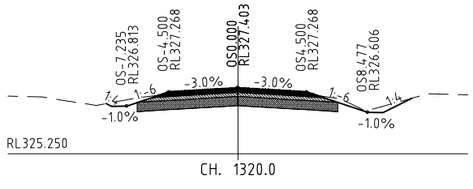
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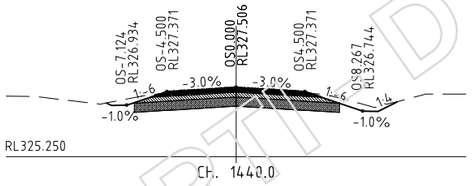
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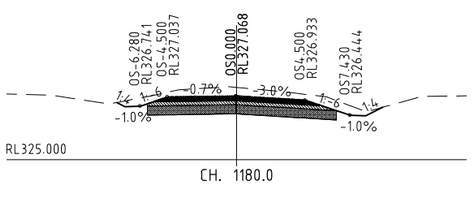
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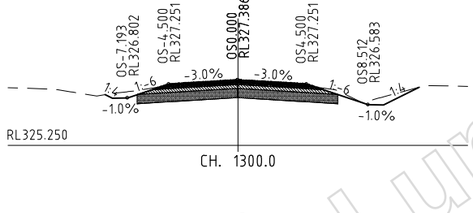
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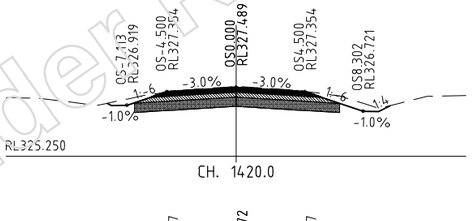
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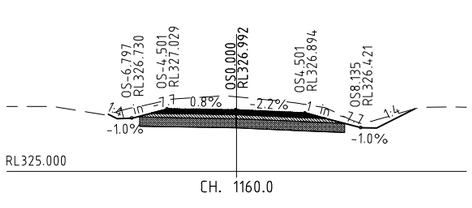
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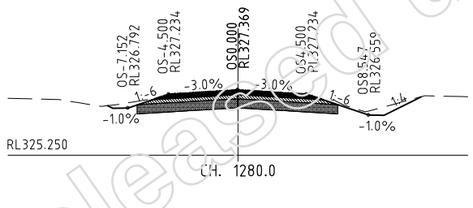
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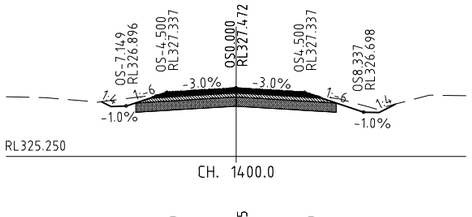
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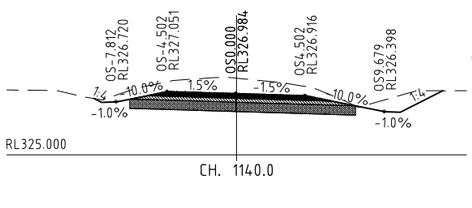
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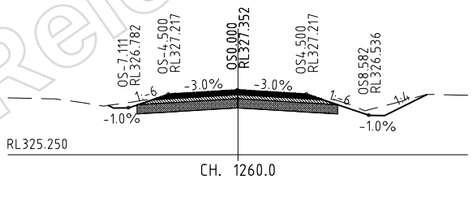
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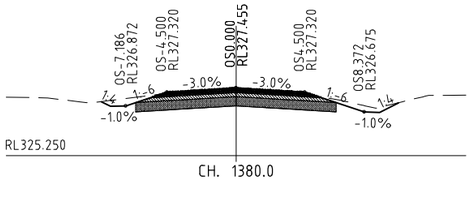
CH. 1400.0



CH. 1140.0



CH. 1260.0



CH. 1380.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION
NR
NR
Date: 04.11.21

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STATUS: FOR CONSTRUCTION

CONTRACTOR DWG No.: 201237 C143

SITE S00
PLANT B01
SECURITY CLASSIFICATION: RESTRICTED

SURAT
INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
CROSS SECTIONS SHEET 4 OF 11

DRAWING No.: S00B01-ARW-CIV-CRS-00037

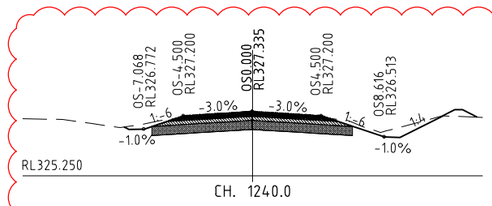
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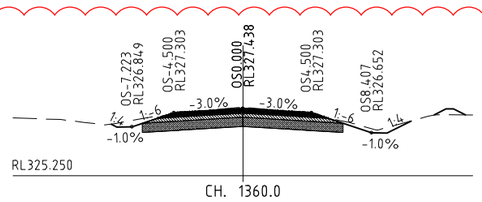
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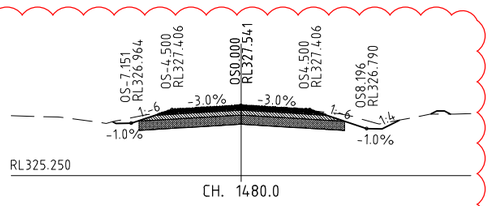
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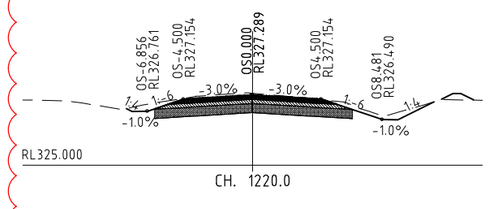
CH. 1240.0



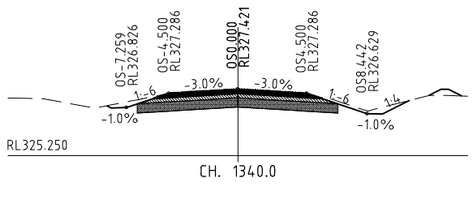
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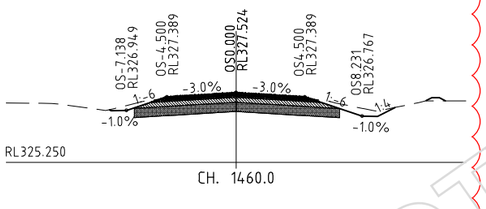
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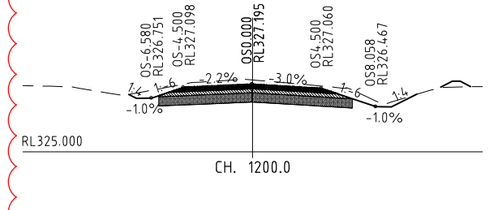
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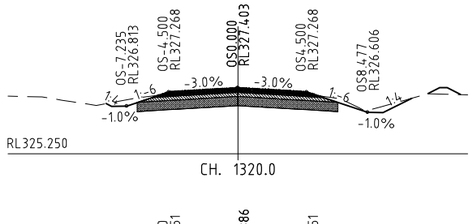
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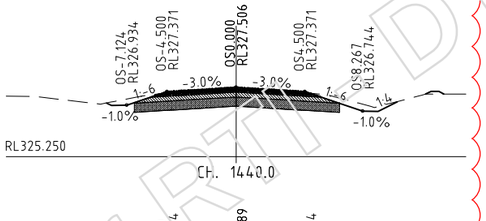
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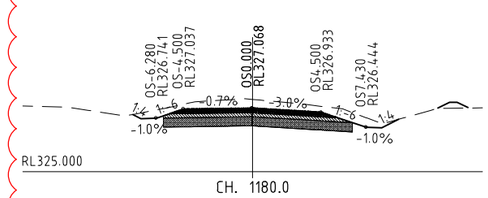
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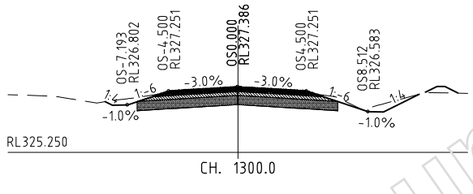
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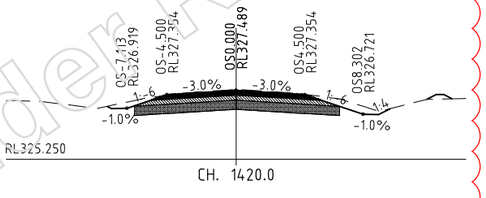
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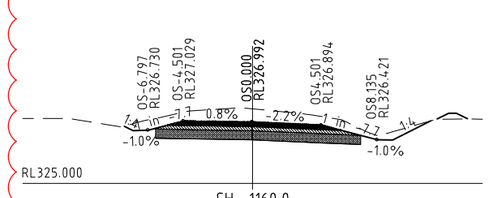
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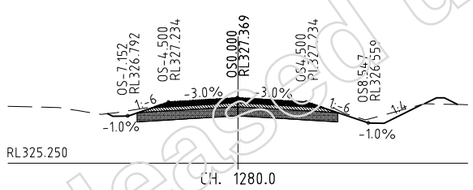
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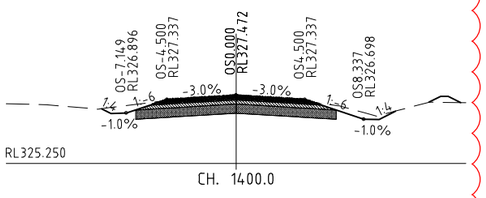
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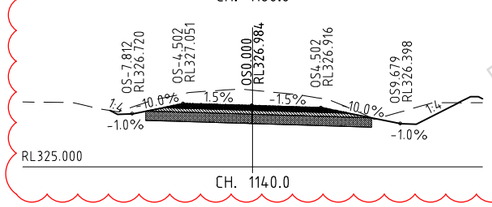
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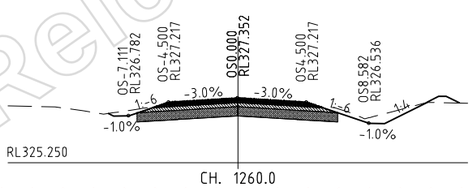
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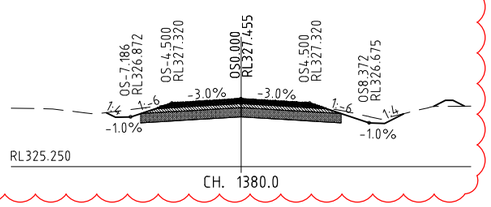
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CH. 1140.0



CH. 1260.0



CH. 1380.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	08.09.22	ISSUED FOR CONSTRUCTION	NR			NR
S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

RPEQ CERTIFICATION

Date: 08.09.22

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STATUS: FOR CONSTRUCTION

CONTRACTOR DWG No.: 201237 C143

SITE: S00

PLANT: B01

SECURITY CLASSIFICATION: RESTRICTED

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 4 OF 11

DRAWING No.: S00B01-ARW-CIV-CRS-00037

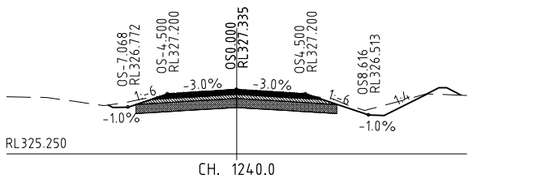
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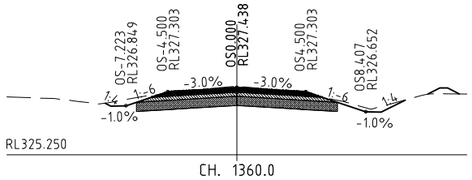
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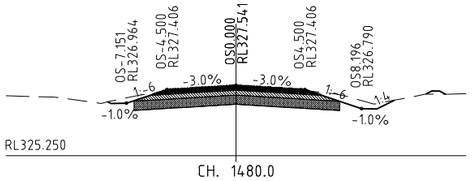
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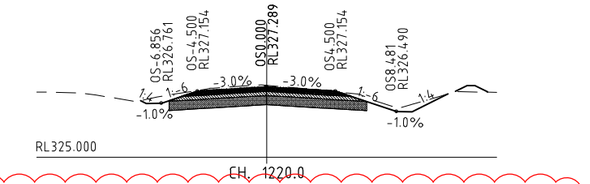
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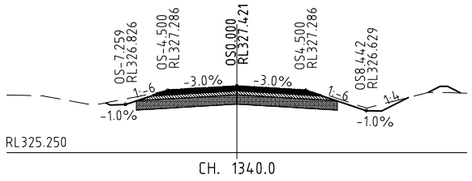
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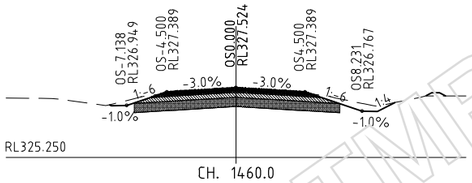
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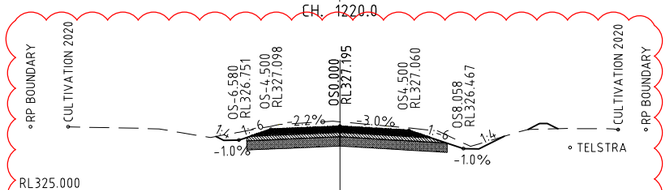
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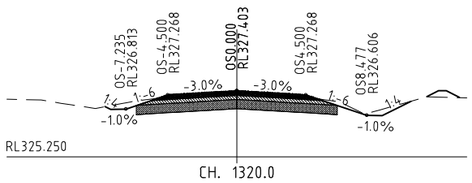
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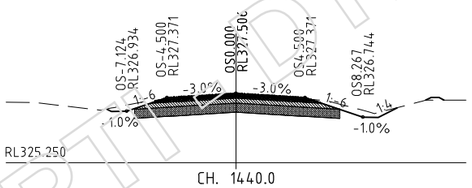
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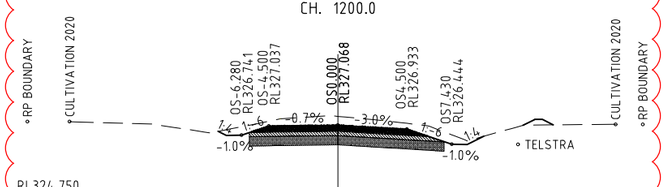
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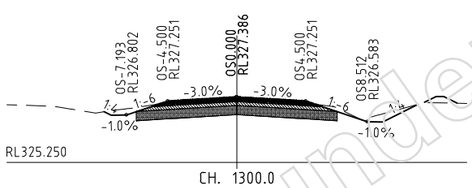
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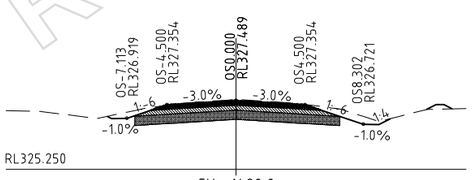
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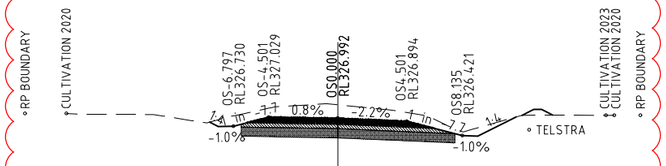
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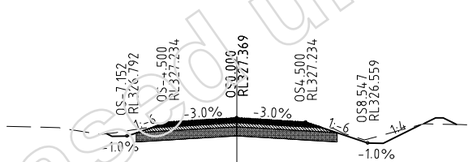
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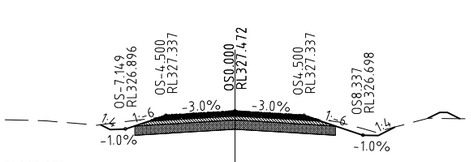
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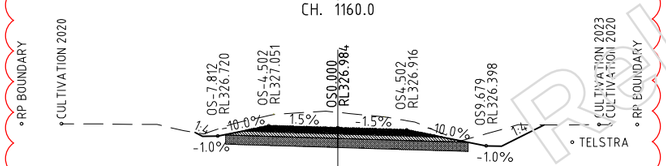
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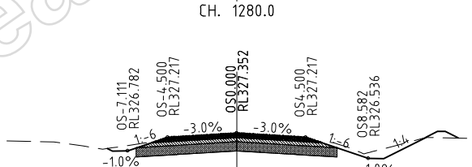
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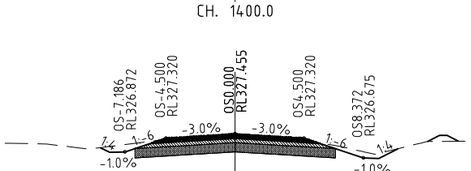
CH. 1400.0



CH. 1140.0



CH. 1260.0



CH. 1380.0

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION
		3	01.02.23	ISSUED FOR CONSTRUCTION
		2	08.09.22	ISSUED FOR CONSTRUCTION
S00B01-ARW-CIV-CRS-00038	CROSS SECTIONS SHEET 5 OF 11	1	04.11.21	ISSUED FOR CONSTRUCTION
S00B01-ARW-CIV-CRS-00036	CROSS SECTIONS SHEET 3 OF 11	0	31.05.21	ISSUED FOR CONSTRUCTION
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW

ORIG	CHK'D	QA	APP'D	Date: 01.02.2023
JAG	PRH	PML	PML	
JAG	PRH	PML	PML	
JAG	PRH	PML	PML	
MVW	MJP	PML	PML	
MVW	MJP	PML	PML	

NR

RPEQ CERTIFICATION

NR

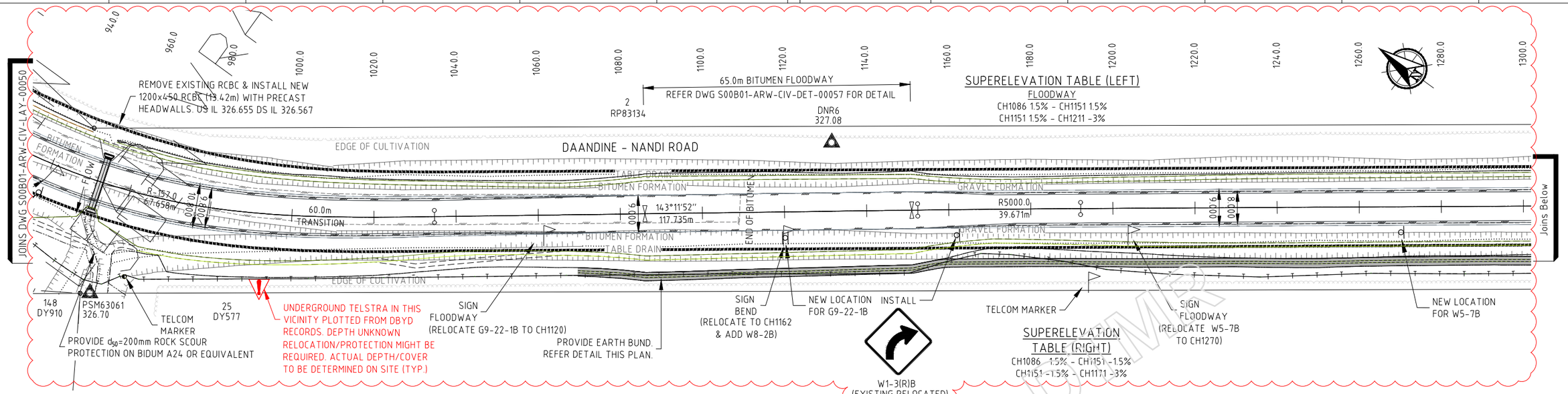
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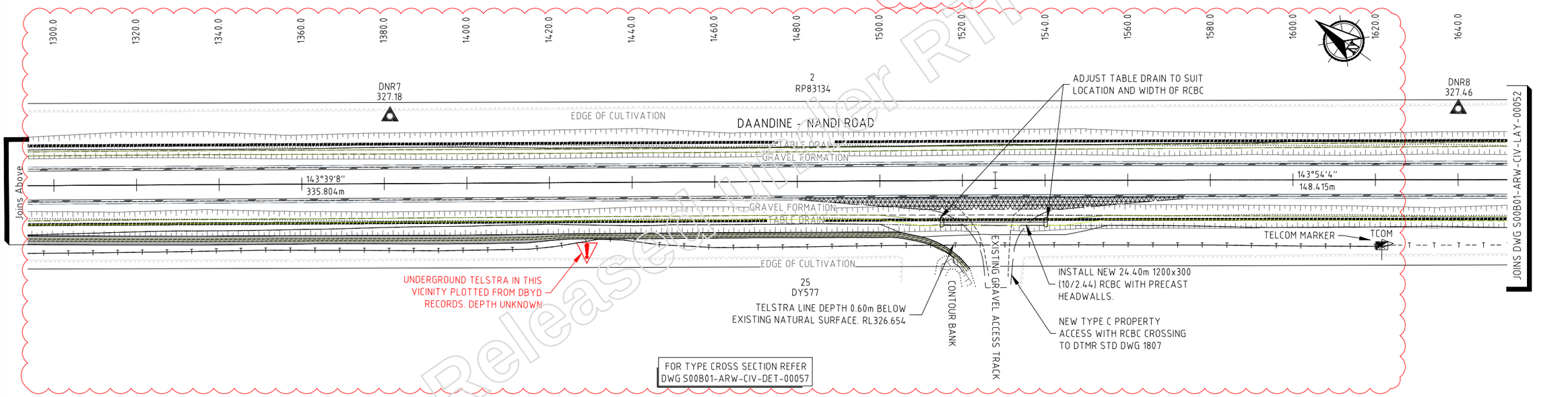
arrow energy go further

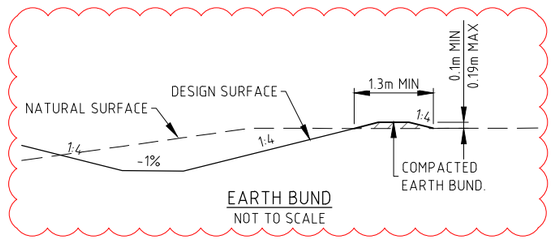
SITE	S00
PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 CROSS SECTIONS SHEET 4 OF 11

STATUS	CONTRACTOR DWG No.	DRAWING No.	SCALE	REV	
FOR CONSTRUCTION	201237 C143	S00B01-ARW-CIV-CRS-00037	AS SHOWN	3	A1







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SCALE 1:500 (A1)

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RPEQ CERTIFICATION NR NR

REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
		2	08.09.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6	1	06.05.22	ISSUED FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

Date: 06.05.22

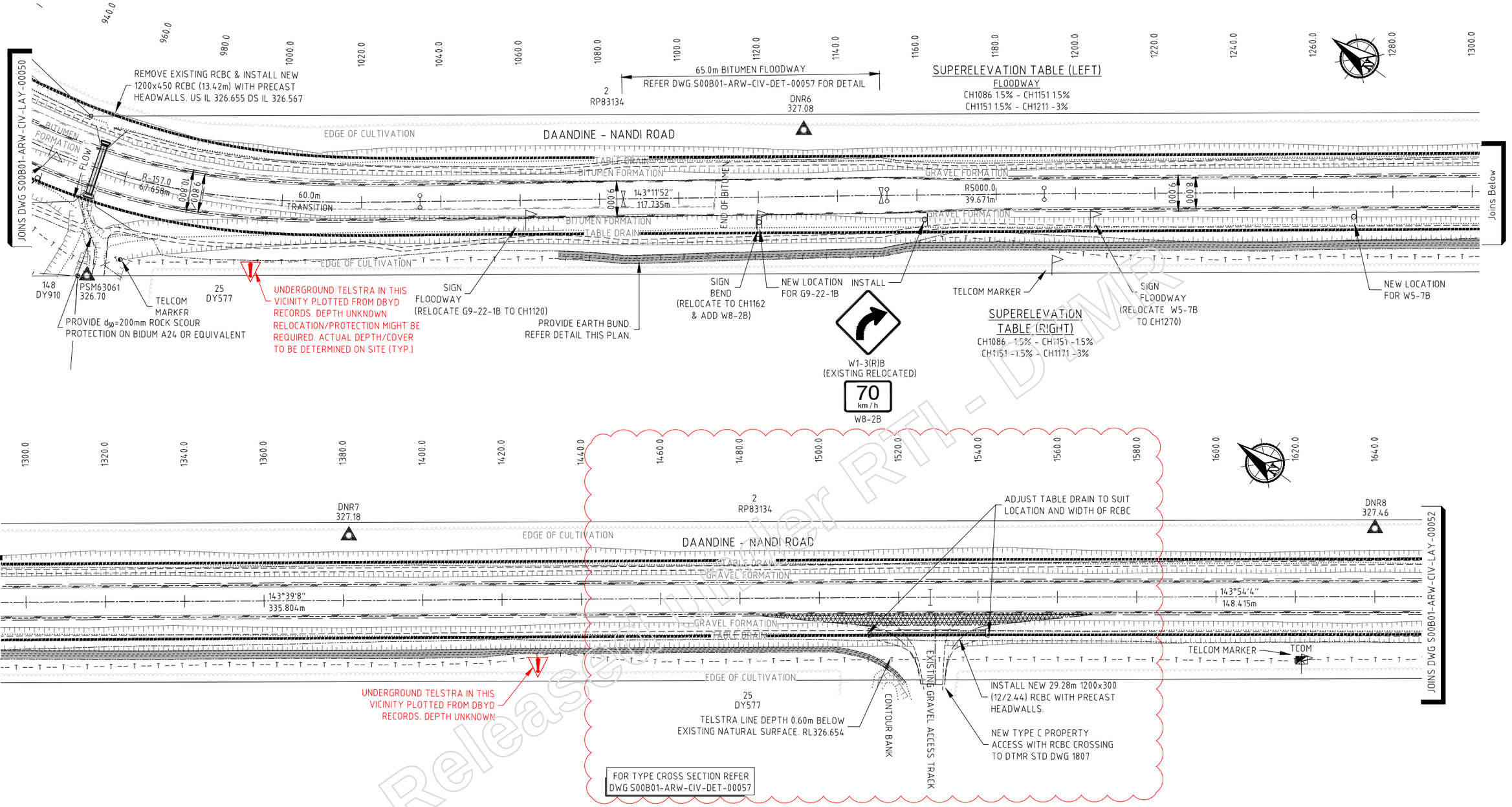
brandon & ASSOCIATES ENGINEERING CONSULTANTS personal professional practical

arrow energy go further

STATUS	FOR CONSTRUCTION
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SITE	S00
PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED
DRAWING No.	S00B01-ARW-CIV-LAY-00051
SCALE	1:500m
REV	2
	A1

SURAT INFRASTRUCTURE DAANDINE-NANDI ROAD SECTION 1 LAYOUT SHEET 3 OF 6

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
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S00B01-ARW-CIV-LAY-00050	LAYOUT SHEET 2 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
S00B01-ARW-CIV-DET-00056	LOCALITY PLAN	A	16.03.21	ISSUED FOR REVIEW	MVW	MJP	PML	PML

Date: 06.05.22

NR

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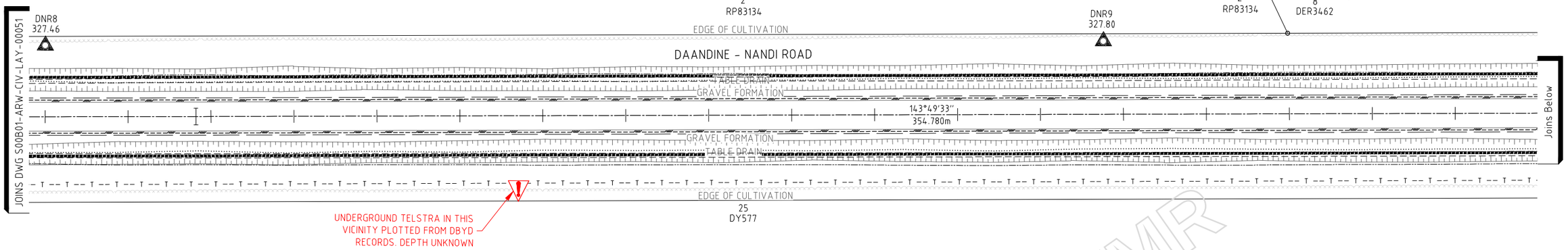
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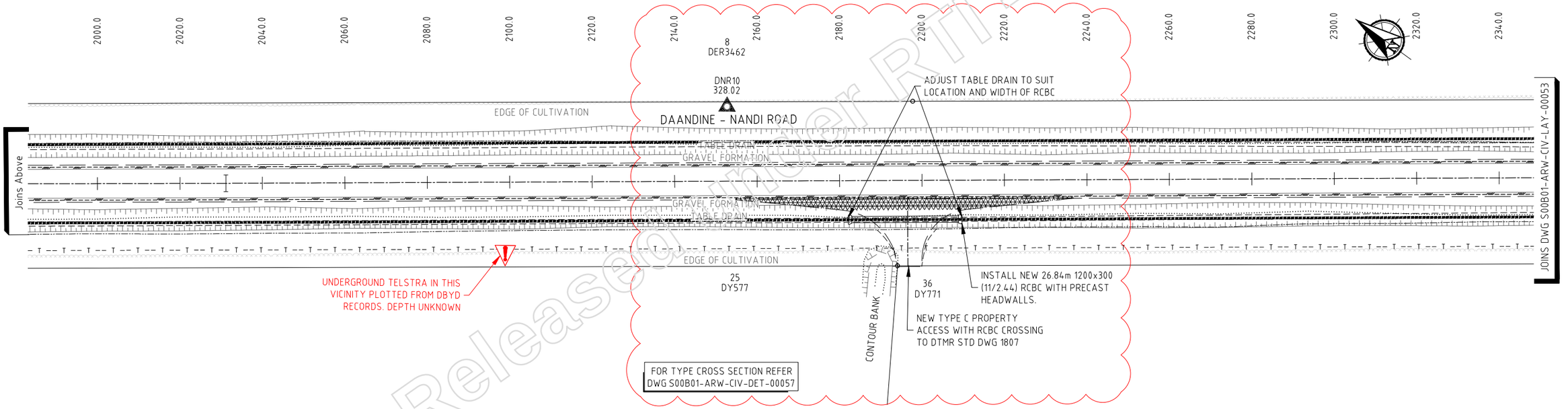
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arrow energy go further

STATUS	FOR CONSTRUCTION
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SITE	S00
PLANT	B01
SECURITY CLASSIFICATION	RESTRICTED
DRAWING No.	S00B01-ARW-CIV-LAY-00051
SCALE	1:500m
REV	3
	A1

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 3 OF 6





10 0 10 20 30 40 50m
SCALE 1:500 (A1)

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REF DOC No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	ORIG	CHK'D	QA	APP'D
					NR			
S00B01-ARW-CIV-LAY-00053	LAYOUT SHEET 5 OF 6	1	05.10.22	ISSUE FOR CONSTRUCTION	JAG	PRH	PML	PML
S00B01-ARW-CIV-LAY-00051	LAYOUT SHEET 3 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
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RPEQ CERTIFICATION
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Date: 05.10.22

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CONTRACTOR DWG No. 201237 C113

SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED
DRAWING No. S00B01-ARW-CIV-LAY-00052

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 4 OF 6

SCALE 1:500m | REV 1 | A1

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JOINS DWG S00B01-ARW-CIV-LAY-00052

DNR11
328.23

8
DER3462

EDGE OF CULTIVATION

DAANDINE - NANDI ROAD

DNR12
328.55

GRAVEL FORMATION

143°43'36"
683.154m

TABLE DRAIN

Joins Below

BOLT TELSTRA

36
DY771

CONSTRUCT NEW TYPE C PROPERTY ACCESS TO DTMR STD DWG 1807. INSTALL NEW Ø450 RCP WITH PRECAST SLOPING HEADWALLS (24m) US IL 328.385 DS IL 328.328.357

SKERMANS ROAD

SKERMANS RD
G3-5
INSTALL

REMOVE EXISTING 3xØ375 RCP'S & INSTALL NEW 1200x450 RCBC (14.64m) WITH PRECAST HEADWALLS. US IL 328.427 DS IL 328.326

8
DER3462

11
DER3462

DNR13
328.87

11
DER3462

PSM181452
329.04

DAANDINE - NANDI ROAD

EDGE OF CULTIVATION

Joins Above

GRAVEL FORMATION

TABLE DRAIN

144°3'21"
147.073m

FLOW

TELCOM MARKER

EDGE OF CULTIVATION

CONTOUR BANK

UNDERGROUND TELSTRA IN THIS VICINITY PLOTTED FROM DBYD RECORDS. DEPTH UNKNOWN

TELSTRA LINE DEPTH 0.60m BELOW EXISTING NATURAL SURFACE. RL328.174

CONSTRUCT NEW TYPE C PROPERTY ACCESS TO DTMR STD DWG 1807. INSTALL NEW Ø450 RCP WITH PRECAST SLOPING HEADWALLS (OPTIONAL) (18.0m) US IL 328.314 DS IL 328.291

GRAVEL ACCESS TRACK

36
DY771

EXISTING FENCELINE

TPL

FLOW

EARTH ACCESS TRACK

26
DY771

EXISTING TELSTRA PILLAR

CONSTRUCT NEW TYPE A PROPERTY ACCESS TO DTMR STD DWG 1807. REMOVE EXISTING Ø450 RCP AND RE-LAY. INSTALL PRECAST SLOPING HEADWALLS (12m) US IL 328.341 DS IL 328.333

W2-4(R)B
INSTALL

11
DER3462

DNR14
329.16

DAANDINE - NANDI ROAD

EDGE OF CULTIVATION

GRAVEL FORMATION

TABLE DRAIN

Joins Above

143°43'54"
433.424m

144°
94.

JOINS DWG S00B01-ARW-CIV-LAY-00054

10 0 10 20 30 40 50m
SCALE 1:500 (A1)

UNDERGROUND TELSTRA IN THIS VICINITY PLOTTED FROM DBYD RECORDS. DEPTH UNKNOWN

26
DY771

FOR TYPE CROSS SECTION REFER DWG S00B01-ARW-CIV-DET-00057

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S00B01-ARW-CIV-LAY-00052	LAYOUT SHEET 4 OF 6	0	31.05.21	ISSUED FOR CONSTRUCTION	MVW	MJP	PML	PML
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SITE S00
PLANT B01
SECURITY CLASSIFICATION RESTRICTED

SURAT INFRASTRUCTURE
DAANDINE-NANDI ROAD SECTION 1
LAYOUT SHEET 5 OF 6

STATUS FOR CONSTRUCTION
CONTRACTOR DWG No. 201237 C114
DRAWING No. S00B01-ARW-CIV-LAY-00053
SCALE 1:500m
REV 1
A1

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Flood Modelling Results Summary Report

Daandine-Nandi Road Upgrade – Hydraulic Impact Assessment

Arrow Energy

16 May 2023

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Document Status

Version	Document Type	Reviewed By	Approved By	Date Issued
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EXECUTIVE SUMMARY

This report presents the results from the extensive hydraulic modelling undertaken to inform the flood impact assessment of the Daandine-Nandi Road Stage 1 Upgrade project.

Water Technology has developed a detailed 1D/2D hydraulic model for the local catchment, which has been used to assess flood behaviour in the vicinity of the upgrade project and determine the potential hydraulic impacts for the full range of possible flood events up to the 1%AEP flood event, including the following design flood events:

- 1% AEP;
- 2% AEP;
- 5% AEP;
- 10% AEP;
- 20% AEP; and
- 50% AEP.

We understand the upgrade project is intended improve the serviceability of Daandine-Nandi Road including maintaining cross-drainage conditions which are consistent with the pre-upgraded conditions.

Following the development of a base case (pre-construction) hydrodynamic model, the proposed (post-construction) scenario was assessed to quantify the potential impact of peak flood level, peak flow, and flood volume. The proposed culvert arrangement includes one (1) 1200mm by 450mm RCBC with upstream and downstream inverts being 326.655mAHD and 326.567mAHD, respectively. This culvert arrangement is to replace the pre-construction 1200mm by 450mm RCBC.

The hydraulic modelling has been prepared using TUFLOW, a 1D/2D hydrodynamic software capable of assessing flooding, surface water and drainage. TUFLOW is industry standard modelling recognised for its accuracy, speed, and workflow efficiency. TUFLOW is the preferred hydrodynamic software under the Department of Transport and Main Roads Hydrologic and Hydraulic Modelling Guidelines (DTMR, 2019). The hydraulic modelling concluded the proposed works would result in the following impacts to flooding characteristics.

Table 1-1 Flood Impacts

Flooding Characteristic	Impact Values	Assessment against Flood Impact Objective (FIO)
Flood Level Impact	Generally, less than 50mm, with up to 100mm in isolated areas of undeveloped, agricultural land.	Achieves FIOs
Flood Velocity	Generally, less than 0.1 m/s external of the road reserve.	Achieves FIOs
Peak Flow	Less than 1% reduction to peak flow in the 1%AEP flood event and a 3% increase in peak flow in the more frequent events at the entrance to the head ditch.	Achieves FIOs
Flood Volume	Post-construction flood event volume is impacted by up +/- 0.2% of the pre-construction volume.	Achieves FIOs

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The impact values summarised above for peak flow and flood volume represent the lower limit of the ability to estimate differences within the hydraulic model and are considered to demonstrate a “non-worsening” in flow characteristics, in comparison to the existing conditions modelled.

Overall, the modelling indicates Lot 148 on DY910 has negligible impacts to peak flood levels, peak flow, volume, and velocity. Similar negligible flood impacts have been modelled across Lot 25 on DY577.

Consequently, the proposed alignment and associated earthworks are considered to demonstrate no material change to existing flood behaviour or pose an actionable nuisance across the range of modelled flood events. As such, this study demonstrates the outcomes of the flood assessment are consistent with the intent to ensure ‘no net worsening’ on existing flood behaviour.

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1 INTRODUCTION

Water Technology understands the Surat Gas Project (SGP) has commenced the Daandine-Nandi Road Section 1 Upgrade Project ('the upgrade project') which is being managed by Arrow Energy.

FKG Group is responsible for construction of the upgrade project, to facilitate improved access to various service facilities and coal seam gas wells throughout the Surat Basin. Arrow Energy has separately commissioned Brandons and Associates Engineering Consultants to prepare the design of the proposed road upgrade arrangement, which is intended to provide similar culvert cross-drainage capacity.

Arrow Energy is committed to minimising the flood and surface water impacts to ensure no adverse impacts. To that effect, Arrow Energy has also proactively engaged with landholders, the State Government and Western Downs Regional Council (WDRC) to build awareness of the upgrade project.

Water Technology was engaged to prepare a flood model and hydraulic impact assessment for the upgrade project. The purpose of the flood modelling and hydraulic impact assessment was to assess the flood behaviour within the local catchment under the pre-construction and post-construction conditions associated with Section 1 Upgrade of Daandine-Nandi Road. Specifically, the key points of discussion include demonstration of the potential for impacts to flood levels adjacent to the upgraded road segment and potential changes in flow rates and volume entering downstream properties.

This report provides an overview of the modelling results, including the hydraulic modelling methodology and assessment outcomes.

1.1 Design Modelling Philosophy

An industry standard, fit-for-purpose hydrodynamic model using state and local government preferred modelling software TUFLOW has been adopted for this project. The intent of the modelling is to quantify the relative impact of the pre-construction and post-construction flood and surface water behaviour upstream, downstream and in the vicinity of Daandine-Nandi Road. In quantifying impacts, it is necessary to establish flood impact acceptance criteria to determine if the results of the hydraulic modelling are acceptable. A review of relevant local, state, national and industry guidance was undertaken to establish suitable design criteria for acceptance of flood model impacts reported in this study.

1.1.1 Relevant local guidance, policies, and standards

The Western Downs Regional Council Planning Scheme regulates development within flood prone areas through the flood overlay code.

The proposed development is located within the Potential Flood Hazards Area of the flood hazard overlay. The Western Downs Regional Council Planning Scheme does not provide guidance, relevant policy or a standard for acceptable flood impacts associated with infrastructure works.

The Planning Scheme does provide overall outcomes for development in the Potential Flood Hazards Area, such that development:

- Maintains the safety of people on the development site from flood events and minimises the potential damage from flooding to property;
- Does not result in adverse impacts on people's safety, the environment, or the capacity to use land within the floodplain;
- Locates habitable rooms for all accommodation activities above the defined flood level, including freeboard; and

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- Locates the minimum floor level for all building work other than accommodation activities above the defined flood level, including freeboard.

1.1.2 Relevant state guidance, policies, and standards – QUDM

The Queensland Urban Drainage Manual (QUDM), (Institute of Public Works Engineering Australasia, Queensland Division, 2017) is intended to:

- Encourage uniformity in urban drainage design practices throughout Queensland;
- Provide information on current best practice urban drainage management, with the exception of water quality management, which is addressed within other publications; and
- Improve Queensland's resilience to severe storms and climate change through the proper design and management of urban drainage systems.

It is noted the proposed works are not located in an urban area and the applicability of QUDM should be considered accordingly. As an industry standard guide, it is however, relevant to consider any direction that QUDM may provide on acceptable flood impacts.

QUDM does not provide any guidance on acceptable flood impacts but rather that design criteria should ensure that a project does not result in 'actionable nuisance'. QUDM further guides that 'actionable nuisance' arises when a person (including a local government) is liable under common law principles of nuisance where there has been an unlawful or unreasonable interference with a person's use or enjoyment of land, or of some rights over or in connection with the land.

Further, QUDM suggests alterations to the natural flow regime will be lawful if all necessary statutory approvals have been obtained and complied with, and there is no nuisance or interference to the use or enjoyment of affected land.

1.1.3 Relevant state guidance, policies, and standards – Hydrologic and Hydraulic Modelling

It is noted the upgrade project is not a project for the State Department of Transport and Main Roads, however it is relevant to consider available guidance for road infrastructure provided by the State. It is separately noted that although the works are being executed by Arrow Energy, Daandine-Nandi Road is ultimately a State-controlled road and therefore, DTMR are expected to manage ownership and governance of this asset after construction is finalised. The Technical Guideline – Hydrologic and Hydraulic Modelling (DTMR, 2019) defines the minimum requirements which must be met when undertaking hydrologic and hydraulic modelling and/or design work for Transport and Main Roads. This covers delivery of modelling work undertaken by either external consultants or internal staff. This includes cross drainage and flooding assessments. The Guideline provides a preferred afflux (flood level impact) legend but does not provide criteria for acceptable flood impacts.

1.1.4 Relevant state guidance, policies, and standards – Australia Rainfall and Runoff

Australian Rainfall and Runoff is the industry guideline on flood estimation methods. ARR does not provide guidance on acceptable flood impacts in flood modelling but rather advocates for a risk-based approach to determining whether flood impacts are acceptable. The risk-based approach is aligned with Managing the Floodplain: Best Practice Floodplain Management (AIDR, 2017) which recommends that flood impacts be considered in terms of the potential likelihood and consequence associated with hydraulic impacts to:

- Public safety
- Property and infrastructure
- Environment

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1.1.5 Relevant project-specific guidance, policies, and standards

In the absence of specific local, state, or national guidance on acceptable flood impacts in flood modelling, a review of acceptance criteria for infrastructure projects is appropriate. The most recent published flood impact objectives (FIO) were endorsed by the Independent International Panel of Experts for Flood Studies of Inland Rail in Queensland (Commonwealth Government and Queensland Government, 2022).

The FIO do not provide criteria for impacts to peak flow or event volume but do provide a relevant basis for impacts to flood level and flood velocity, as shown in Table 1-1 and Table 1-2, respectively.

It should be noted that the FIO for afflux reported in Table 1-1 is reduced in the Condamine River floodplain to 100mm (with isolated areas up to 200mm) by the International Panel of Experts for Flood Studies of Inland Rail in Queensland.

Table 1-1 Flood Level Afflux (Source: Independent International Panel of Exports for Flood Studies of inland Rail in Queensland)

Parameter	Objectives					
Change In Peak Water Levels (Afflux)	Existing habitable and/or commercial and industrial buildings/premises (e.g., schools, hospitals, shops) and sensitive infrastructure	Yards or gardens of residential or commercial/industrial properties/lots (excluding habitable dwellings/buildings	Existing non-habitable structures (e.g., agricultural sheds, pump-houses)	Existing local roads currently in use and/or existing rail lines	State Controlled Roads	Agricultural and grazing land/forest areas and other non-agricultural land
	<= 10mm	<=50mm	<= 100mm	<= 100mm	<= 20mm	<= 200mm with localised areas up to 400mm.

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Table 1-2 Flood Velocity Impact (Source: Independent International Panel of Exports for Flood Studies of inland Rail in Queensland)

Parameter	Objectives

Velocity	Maintain existing velocities where practical or minimise increases in velocities. Identify changes to velocities and impacts on external properties.
	
	The Erosive Threshold Velocity (ETV) for natural ground surfaces should be established from a site-specific assessment by a suitably qualified specialist, and in consideration of engineering guidelines. For sealed surfaces, this same approach could be applied, or through reference to suitable guidelines/specifications.
	
	Assess against the following performance objectives:
	■ Sealed surfaces (or surfaces otherwise protected against erosion):
	  ■ For existing velocities equal to or greater than 1m/s (or the defined ETV), the increase in velocity is limited to 20%.
	  ■ For existing velocities (or velocities associated with new flow paths) less than 1m/s, the maximum design velocity is 1.2m/s (or the defined ETV).
	■ Natural ground surfaces including watercourses, agricultural land, unimproved grazing land, and other unsealed or unprotected areas:
	  ■ For existing velocities equal to or greater than 0.5m/s (or the defined ETV), the increase in velocity is limited to 10% (or within an acceptable range as determined by geomorphological assessment).
	  ■ For existing velocities (or velocities associated with new flow paths) less than 0.5m/s (or the defined ETV), the maximum design velocity is 0.5m/s (or the defined ETV).

1.2 Flood Impact Objective

Following a review of relevant local, state, national and industry guidance the following design criteria is to be adopted as the descriptors of non-worsening of flood model impacts reported in this study, as shown in Table 1-3.

The defined criteria align with Arrow Energy's commitment to achieve non-worsening in accordance with relevant industry guidelines and reference material as discussed above. The values adopted for this project have a lower threshold than the flood impact objectives adopted for other infrastructure projects reviewed in Section 1.1 or in the case of impacts to total event volume and peak flow are considered to represent the lower limit of the ability to estimate differences within the hydraulic model and are considered to demonstrate a non-worsening in flow characteristics.

Table 1-3 Flood Impact Objectives

Flood characteristic	Flood Impact Objective
Flood level impacts (afflux)	Up to 100mm
Flood velocity impact	Up to 10% increase in peak velocity
Event volume change	Less than 1% reduction
Peak flow change	Less than 5% reduction

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2 OVERVIEW

2.1 Site Locality and Description

The upgrade project is located along a north-western section of Daandine-Nandi Road approximately 25 kilometres west of Dalby and approximately 960 metres south of the intersection of Daandine-Nandi Road and Dalby Kogan Road. A map provided by Arrow Energy shows the general locality of the proposed road upgrade project, is shown in Figure 2-1.



Figure 2-1 Site Locality (Arrow Energy)

The key landholders in the vicinity of the upgrade project, as shown in Figure 2-2, are:

- On the upstream side (northeast) of the road:
  - Lot 2 on RP83134.
- On the downstream (south-southwest) of the road:
  - Lot 157 on DY910, Lot 148 on DY910; and
  - Lot 25 on DY577.

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Figure 2-2 Properties of interest

The upgraded road segment is located within a local overland flow path within the Condamine-Balonne River basin. We understand that water extracted from this river system is used for domestic and agricultural purposes, for which off-take is regulated. Further, the property at Lot 25 on DY577 (downstream of the upgrade project) has a significant interest in preservation of the overland flow, as they are known to utilise overland flow to fill a large (approximately 19 hectare) ring tank, which is used for intensive farming operations, including the irrigation of crops; the remainder of Lot 25 on DY577, is mostly covered in agricultural land and low-density vegetation.

Maps showing the specific location of the upgrade crossing, including culvert cross-drainage provisions and floodway crossing are included in Figure 2-3 and the pre-construction digital elevation model is provided in Figure 2-4.

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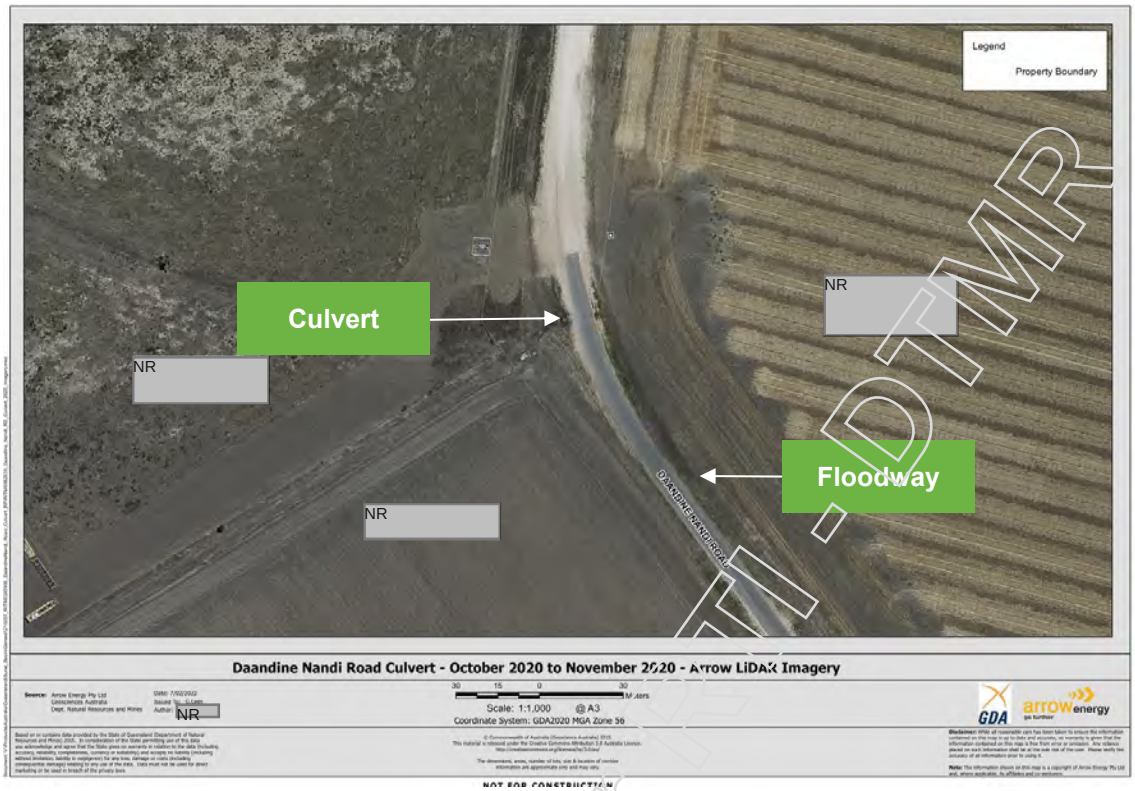


Figure 2-3 Daandine-Nandi Road Structure Locations (Arrow Energy)

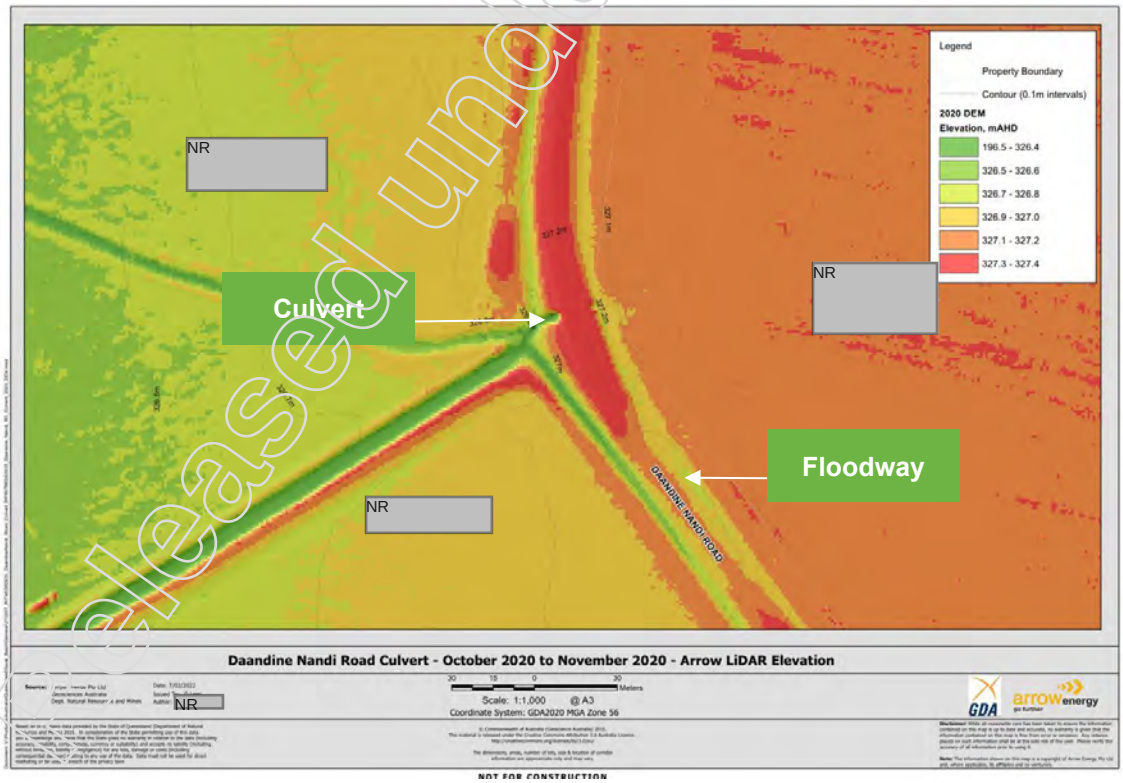


Figure 2-4 Existing Daandine-Nandi Road November 2020 LiDAR Dataset (Arrow Energy)

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2.2 Proposed Development

The proposed works include the raising and widening of Daandine Nandi Road, to facilitate improved access to various service facilities within the Surat Basin. It is proposed that the existing cross-drainage will be maintained by extending the existing cross-drainage culvert to suit the widened road and replacing the existing floodway to the east of the cross-drainage culvert. The proposed culvert arrangement is one (1) 1200mm by 450mm RCBC with upstream and downstream inverts being 326.655mAHD and 326.567mAHD, respectively. It is also necessary to relocate the existing floodway further to the east to accommodate the finished road geometry. Civil design drawings showing the post-upgrade cross-drainage arrangement are provided in Figure 2-5. The survey sheets (feature drawings) drawings originally prepared by Brandons and Associates for the upgraded road section have been included as Figure 2-6 and Figure 2-7.

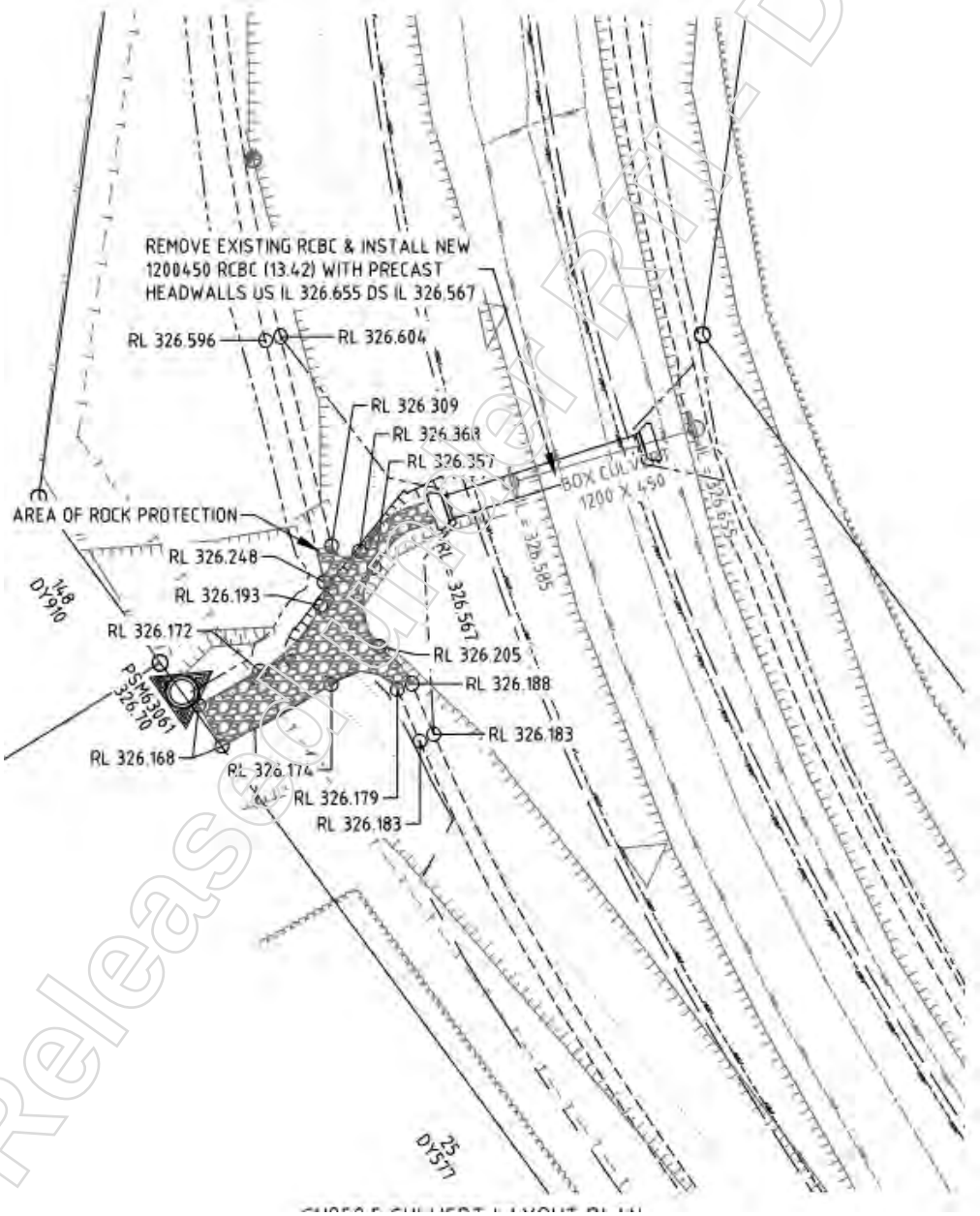


Figure 2-5 Post-Upgrade Cross-Drainage Arrangement (Brandons and Associates)

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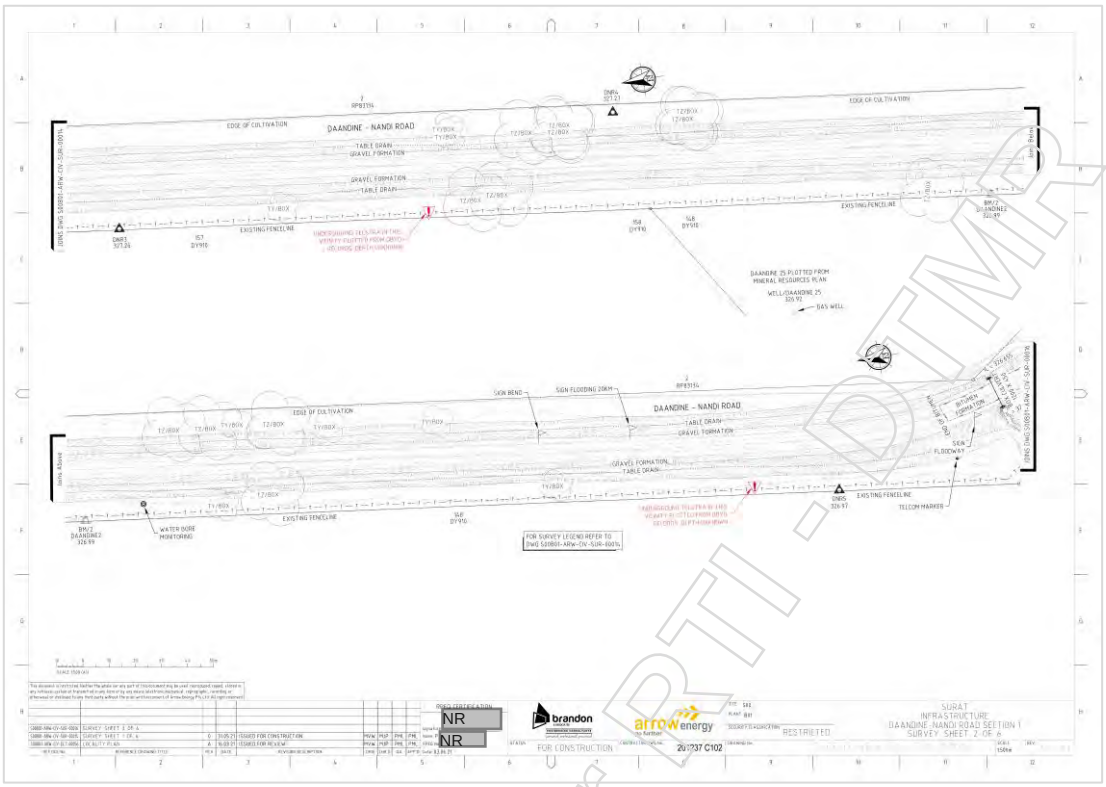


Figure 2-6 Daandine-Nandi Road Upgrade Survey Sheet 2 (Brandons and Associates)

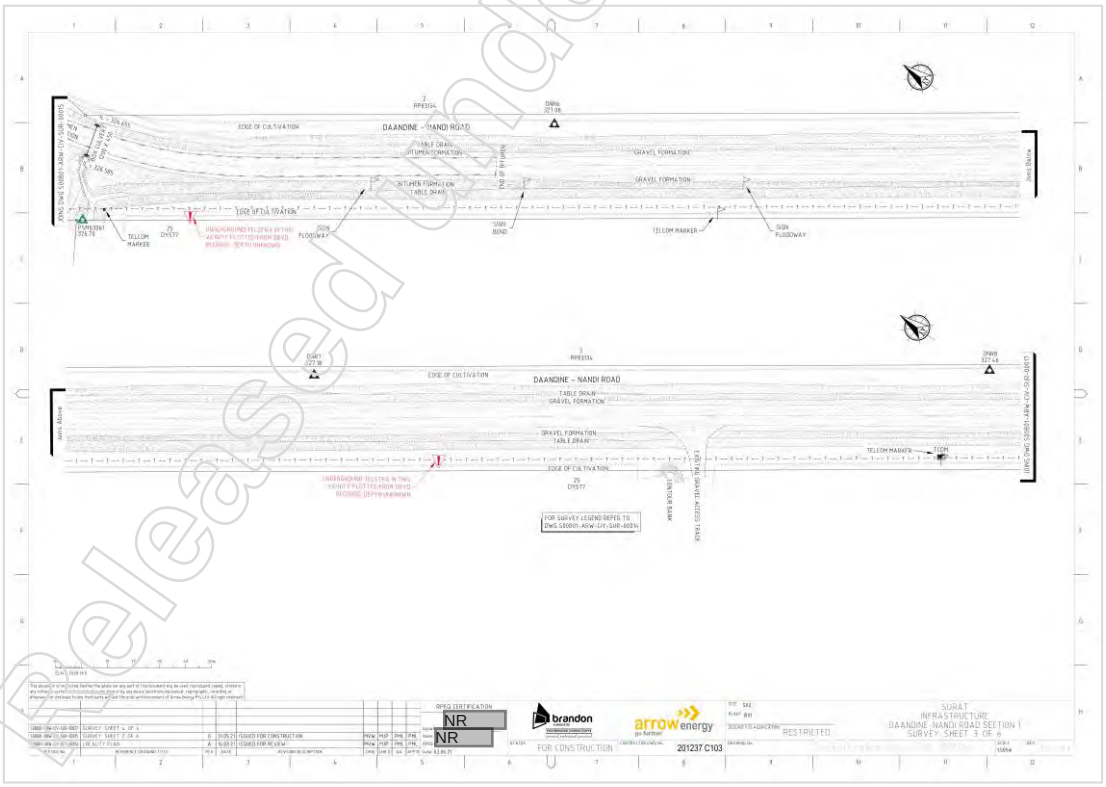


Figure 2-7 Daandine-Nandi Road Upgrade Survey Sheet 3 (Brandons and Associates)

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3 AVAILABLE LIDAR DATASETS

3.1 Base LiDAR Datasets

In order to complete this assessment, Arrow Energy provided Water Technology with LiDAR datasets captured in 2012, 2014, 2020, and 2021. These datasets were used to assess the change in flow regimes across the catchment throughout the last decade and understand the potential impacts of the upgrade project. The supplied LiDAR in the vicinity of the upgrade project are included as figures as indicated below:

- LiDAR Dataset (2012) - Figure 3-1
- LiDAR Dataset (2014) - Figure 3-2
- LiDAR Dataset (2020) - Figure 3-3
- LiDAR Dataset (2021) - Figure 3-4

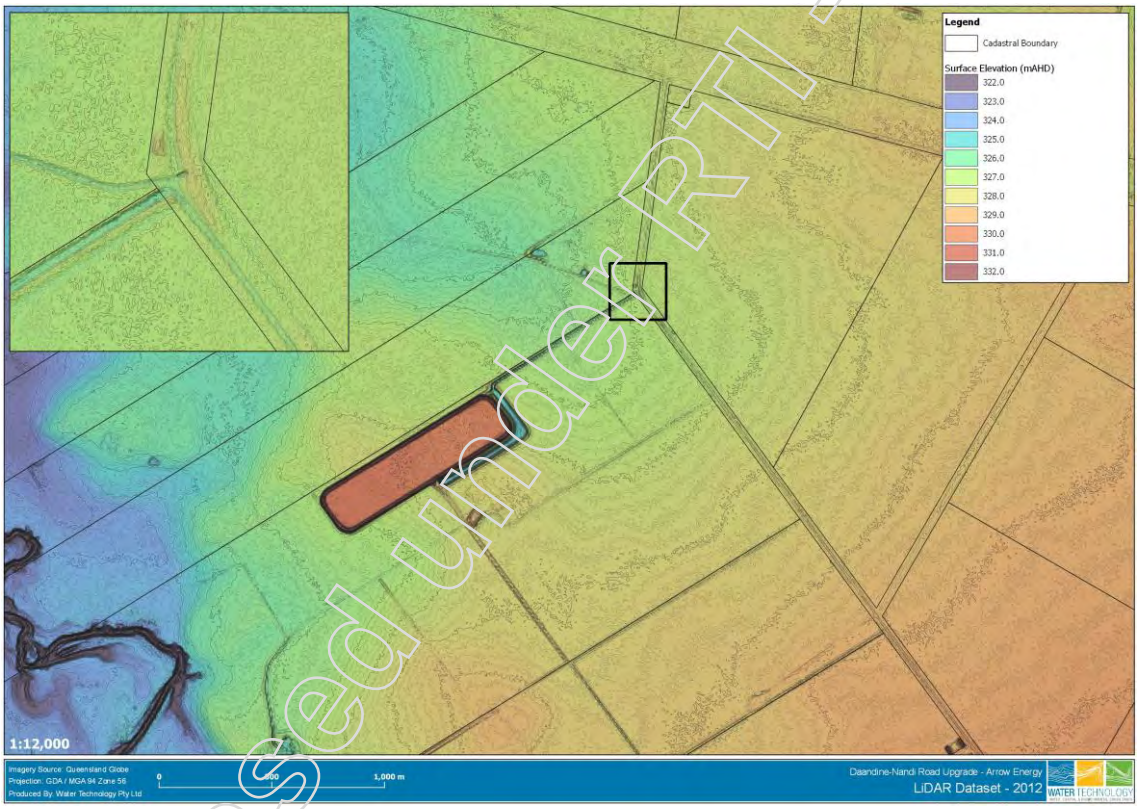


Figure 3-1 Provided LiDAR Dataset - 2012

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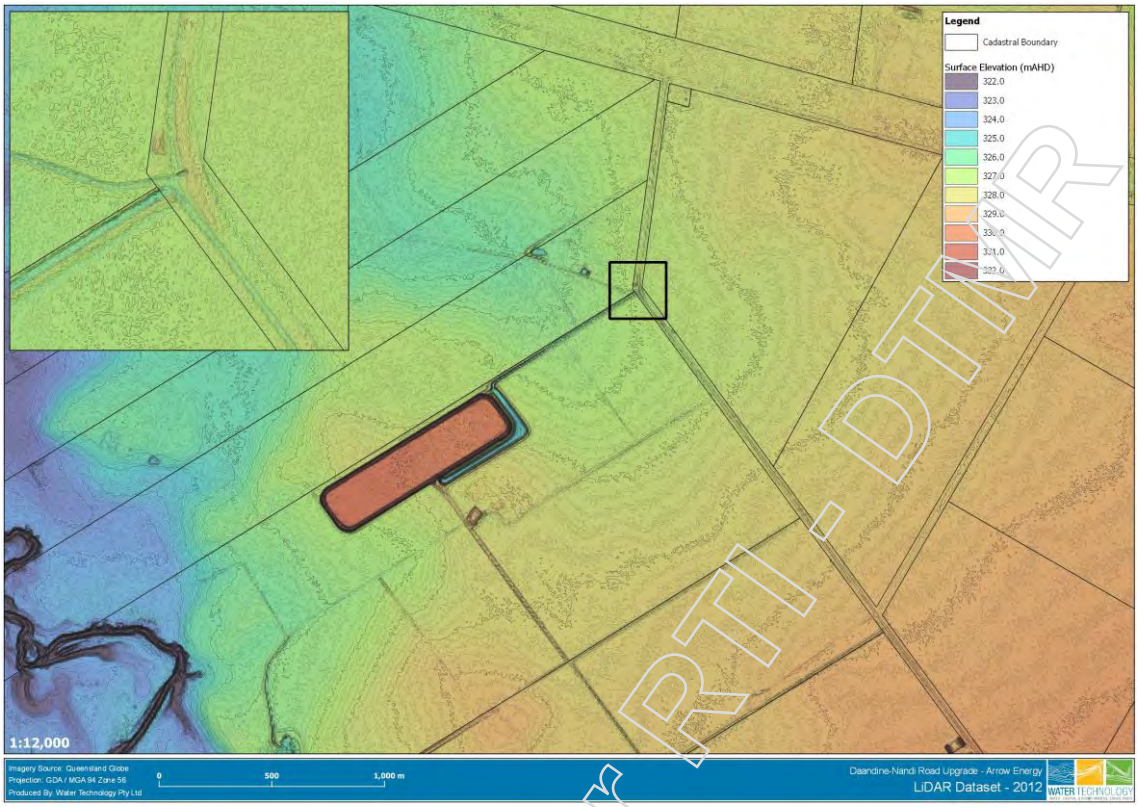


Figure 3-2 Provided LiDAR Dataset - 2014

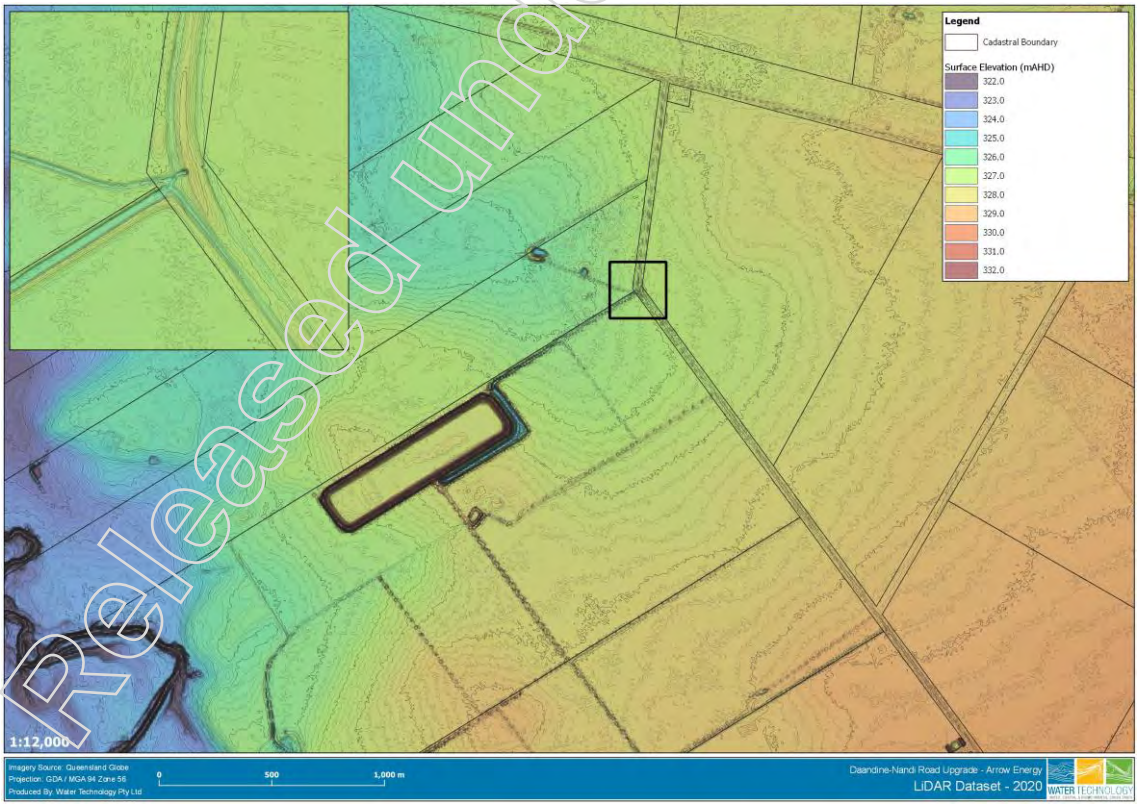


Figure 3-3 Provided LiDAR Dataset - 2020

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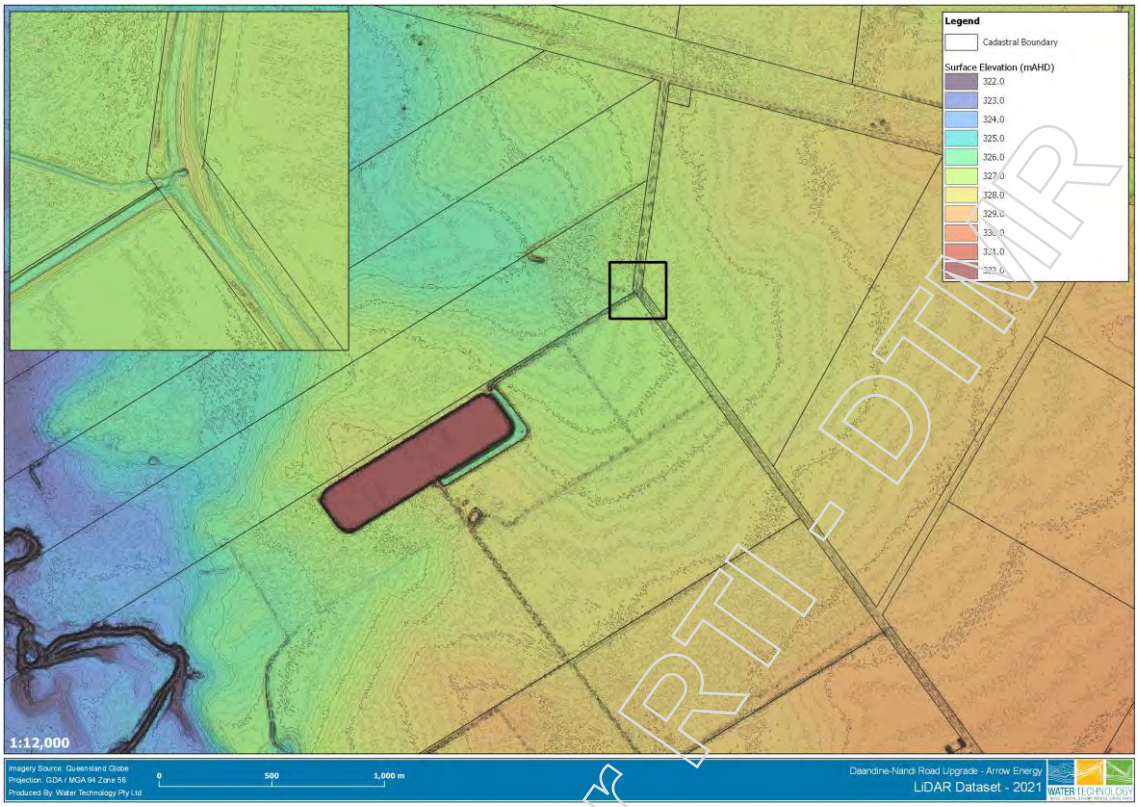


Figure 3-4 Provided LiDAR Dataset – 2021

3.2 Pre- and Post-Development Topographic Data

Arrow Energy has requested a flood impact assessment of the pre-construction and post-construction flood regimes based on the 2020 LiDAR datasets with inclusion of the pre-development surface and post-development proposed road design surface. As such, for the purpose of this assessment, the 2020 LiDAR has additionally been overlayed with pre-development and post-development surfaces supplied by Arrow Energy. Maps showing the modified topographic data to include the provided designs are also included as figures as indicated below:

- LiDAR Dataset (2020 With Pre-Development TIN) - Figure 3-5
- LiDAR Dataset (2020 With Post-Development TIN) - Figure 3-6

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Figure 3-5 Pre-construction Digital Elevation Model (With Pre-Development TIN)



Figure 3-6 Post-construction Digital Elevation Model (With Post-Development TIN)

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4 HYDRAULIC MODELLING RESULTS

4.1 Overview of Hydraulic Model

A hydraulic model for the local catchment was developed using TUFLOW, the industry leading 1D/2D hydrodynamic software capable of assessing flooding, surface water and drainage.

Water Technology has prepared a hydraulic model for the local catchment to understand flooding behaviour for a range of design flood events, with likelihoods from frequent to rare events up to the 1%AEP, in accordance the latest Australian Rainfall and Runoff 2019 (ARR2019) flood estimation methods. Specifically, this included the following Annual Exceedance Probability (AEP) events:

- 50%AEP
- 20%AEP
- 10%AEP
- 5%AEP
- 2%AEP
- 1%AEP

4.2 Hydraulic Model Development

The TUFLOW hydraulic model has been developed to assess flooding within the local catchment and potential impacts associated with the upgrade project.

Due to the overall flat topography and ill-defined flow paths within the upstream catchment, a direct-rainfall model has been developed. In catchments of this nature, direct rainfall models are considered a robust and fit-for-purpose approach to hydraulic impact assessments. The direct rainfall approach applies the rainfall hyetographs to each individual active cell within the hydrodynamic model, where water accumulates before propagating to adjacent cells based on routing guided mostly by topography and hydraulic roughness.

4.3 Difference Between Pre- and Post-Construction Hydraulic Modelling

To represent the change in flooding characteristics between the pre-construction and post-construction scenarios, two following key modifications in the hydraulic model were undertaken:

- Adjustments to the topography in the hydraulic model to represent the modified roadway alignment; through the inclusion of the supplied TIN of the upgrade works, and associated works. Outside of the extents of the provided pre-construction and post-construction design TINs, the 2020 LiDAR-derived DEM has been adopted for the remainder of the catchment.
- Adjustments to the cross-drainage provisions underneath Daandine-Nandi Road. The modelling adopts the original 1 / 1200mm × 450mm RCBC structure extended to reflect the new road alignment.

The modifications to the ground levels are illustrated in Figure 4-1.

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Figure 4-1 Change In Ground Levels (Pre- and Post-Construction)

Analysis of the outcomes of the hydraulic modelling have been prepared as a detailed reporting at the upgrade project and on surrounding properties and as a suite of GIS maps illustrating the pre-construction and post-construction flood maps. These maps are included separately as Appendix A to Appendix C.

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4.4 Peak Discharge and Net Volume Comparisons

The 1%, 2%, 5%, 10%, 20%, and 50% AEP design flood events for pre-construction and post-construction scenarios were simulated. Peak flow and event flood volume at various reporting locations have been extracted and analysed. These locations are illustrated in Figure 4-2 and Figure 4-3, and were selected to assess the potential flood impacts at key locations including:

- Through Daandine-Nandi Road culvert cross-drainage;
- Along the south-eastern channel;
- Along north-western channels downstream of the road; and
- Along the south-western channels downstream of the road.

In addition, there are various analysis points located downstream of Daandine-Nandi Road where additional flood level and depth data was extracted.

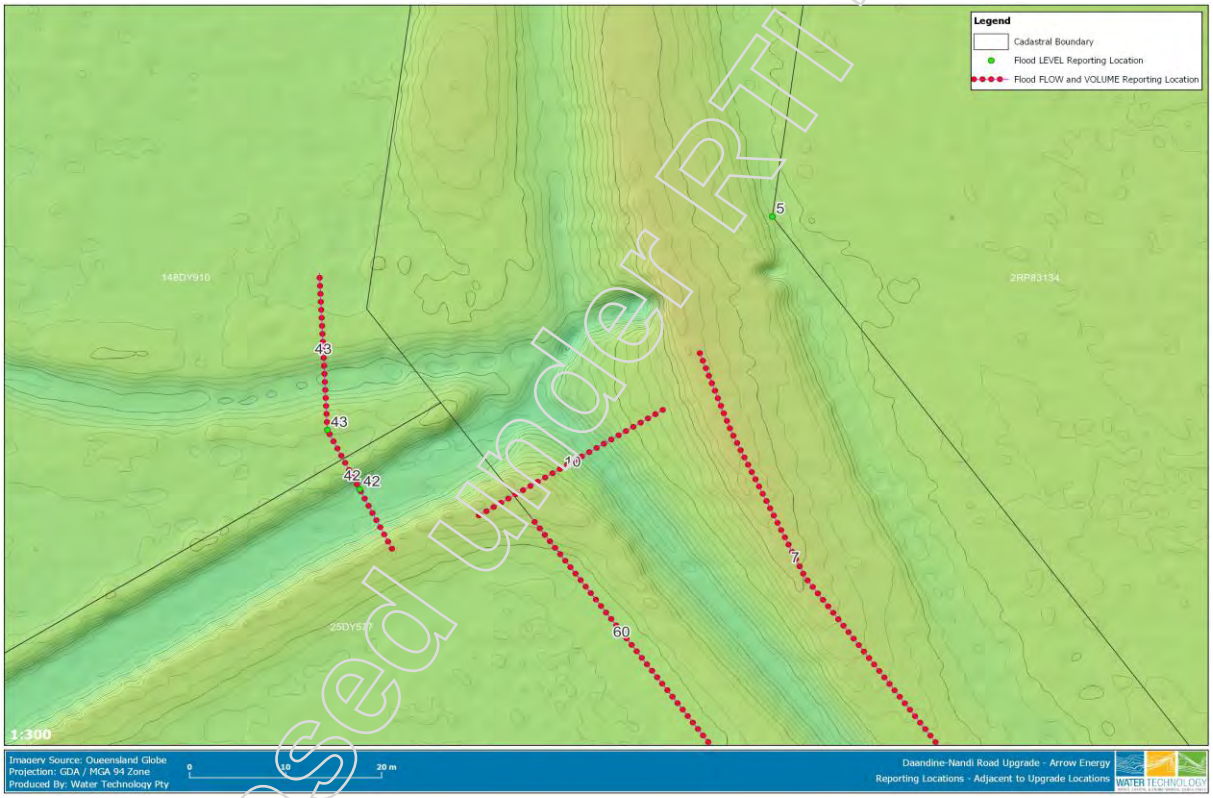


Figure 4-2 Reporting Locations – Adjacent To Upgrade Location

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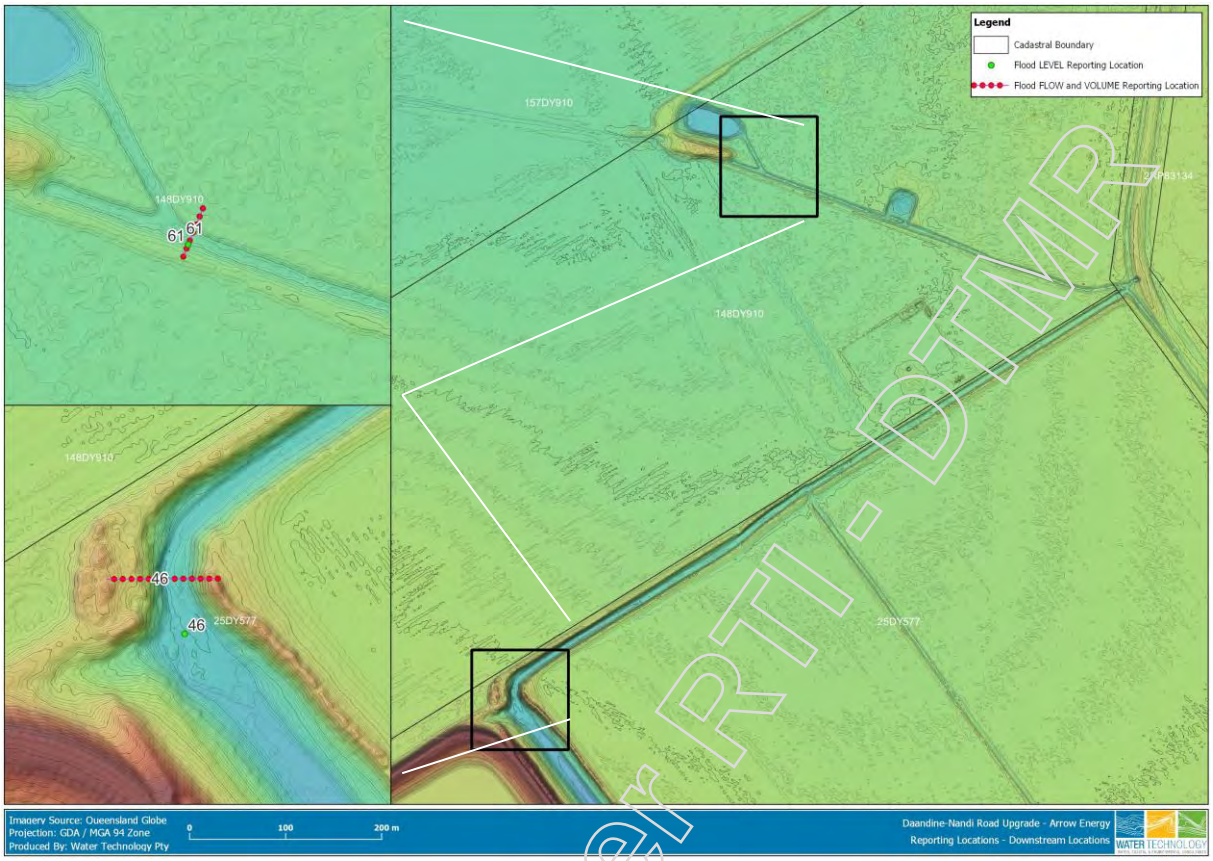


Figure 4-3 Reporting Locations –Downstream Locations

A summary of the flow and flood volumes for each of the historic topography scenarios, as well as the 2020 pre-development and post-development data, is included in the tables as indicated below:

- Flow Comparison - Table 4 1
- Volume Comparison - Table 4 2

Additionally, flood level timeseries for the pre-construction and post-construction scenarios for all design flood events at the locations of the dam on Lot 148 on DY910 (Point 61) and Lot 25 on DY577 (Point 46) have also been included in the figures as indicated below:

- Lot 148 on DY910 (Point 61) Flow Timeseries - Figure 4 4
- Lot 25 on DY577 (Point 46) Flow Timeseries - Figure 4 5

Further assessment of the peak flow and net flood volumes for the various historic LiDAR datasets, aimed at comparing the change in flow due to modified topography between 2012, 2014, 2020, and 2021.

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Table 4-1 Flow Comparison

Reporting Location	Scenario	01 % AEP	02% AEP	05% AEP	10% AEP	20% AEP	50% AEP
Flow Summary (m^3/s)							
PO 46	Existing	2.76	2.70	2.36	2.21	2.29	1.73
	Developed	2.77	2.72	2.40	2.22	2.32	1.78
PO 61	Existing	0.62	0.62	0.61	0.59	0.60	0.43
	Developed	0.64	0.64	0.63	0.61	0.63	0.50
PO 7	Existing	14.53	11.17	8.14	5.05	3.19	0.82
	Developed	14.60	11.22	8.20	5.09	3.41	1.04
PO 60	Existing	12.08	8.98	6.16	3.32	1.67	0.02
	Developed	12.33	9.28	6.49	3.53	1.81	0.02
PO 10	Existing	2.80	2.57	2.38	2.13	1.86	0.84
	Developed	3.12	2.90	2.72	2.50	2.18	1.12
PO 42	Existing	2.25	2.13	2.02	1.87	1.70	1.08
	Developed	2.18	2.10	2.02	1.92	1.80	1.16
PO 43	Existing	1.20	1.12	1.04	0.95	0.85	0.44
	Developed	1.30	1.22	1.15	1.07	0.95	0.50
Culvert	Existing	0.94	0.91	0.88	0.83	0.78	0.62
	Developed	0.95	0.93	0.90	0.84	0.74	0.50
Change In Flow (m^3/s)							
PO 46	Developed - Existing	0.01	0.02	0.05	0.01	0.02	0.06
PO 61		0.02	0.02	0.02	0.02	0.03	0.07
PO 7		0.07	0.06	0.05	0.04	0.22	0.22
PO 60		0.26	0.30	0.33	0.21	0.14	0.01
PO 10		0.31	0.33	0.34	0.37	0.32	0.28
PO 42		-0.08	-0.04	0.00	0.05	0.09	0.08
PO 43		0.10	0.10	0.11	0.12	0.10	0.07
Culvert		0.02	0.02	0.02	0.01	-0.04	-0.12
Change In Flow (%)							
PO 46	Developed – Existing) / Existing	0.19%	0.58%	1.95%	0.40%	0.98%	3.21%
PO 61		2.95%	2.77%	4.11%	3.41%	5.12%	15.24%
PO 7		0.47%	0.50%	0.67%	0.71%	6.85%	27.04%
PO 60		2.12%	3.36%	5.31%	6.24%	8.37%	29.81%
PO 10		11.19%	12.72%	14.41%	17.46%	17.08%	32.71%
PO 42		-3.42%	-1.76%	0.18%	2.89%	5.36%	7.55%
PO 43		8.12%	9.11%	10.17%	12.69%	11.53%	15.63%
Culvert		1.71%	1.76%	1.82%	1.26%	-4.68%	-18.94%

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Table 4-2 Volume Summary

Reporting Location	Scenario	01 % AEP	02% AEP	05% AEP	10% AEP	20% AEP	50% AEP
Volume Summary (m^3)							
PO 46	Existing	27552	27923	28400	28635	28829	28365
	Developed	27489	27920	28428	28659	28863	28408
PO 61	Existing	3835	3610	4340	4286	3916	4518
	Developed	3943	3636	4388	4324	3914	4378
PO 7	Existing	404609	312304	210759	134748	79067	14980
	Developed	413553	322167	221544	146009	89374	21008
PO 60	Existing	294491	212420	124584	61835	24397	150
	Developed	306561	223345	131674	65701	26483	107
PO 10	Existing	135088	122454	105733	85416	63173	16381
	Developed	158103	143959	125078	103278	76982	23689
PO 42	Existing	121900	112856	99449	85910	67954	31944
	Developed	124272	115487	103306	89349	71165	33153
PO 43	Existing	60466	54999	47877	39913	29947	9755
	Developed	66907	61049	53329	44258	33102	10825
Culvert	Existing	55896	52072	47720	42725	36263	23492
	Developed	53221	49725	44295	38282	31566	18935
Change In Volume (m^3)							
PO 46	Developed - Existing	-63	-3	28	24	35	43
PO 61		107	26	48	37	-2	-140
PO 7		8944	9863	10786	11261	10307	6028
PO 60		12070	10924	7090	3866	2086	-43
PO 10		23016	21504	19345	17862	13809	7307
PO 42		2372	2632	3857	3439	3211	1209
PO 43		6441	6050	5452	4346	3155	1070
Culvert		-2675	-2346	-3425	-4443	-4697	-4557
Change In Volume (%)							
PO 46	(Developed - Existing) / Existing	-0.23%	-0.01%	0.10%	0.09%	0.12%	0.15%
PO 61		2.80%	0.72%	1.10%	0.87%	-0.05%	-3.10%
PO 7		2.21%	3.16%	5.12%	8.36%	13.04%	40.24%
PO 60		4.10%	5.14%	5.69%	6.25%	8.55%	-28.48%
PO 10		17.04%	17.56%	18.30%	20.91%	21.86%	44.61%
PO 42		1.95%	2.33%	3.88%	4.00%	4.73%	3.78%
PO 43		10.65%	11.00%	11.39%	10.89%	10.54%	10.97%
Culvert		-4.79%	-4.51%	-7.18%	-10.40%	-12.95%	-19.40%

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4.5 Summary of Results - Peak Flow and Event Volume

4.5.1 Overview

The magnitude of change in peak flow at all reporting locations is minor, with the maximum change in peak flow external of road reserve limited to 0.12m3/s. This includes:

- Peak flow entering Lot 25 on DY577 at the site boundary (reporting point PO42), immediately downstream of the proposed upgrade works, is generally consistent between the pre-construction and post-construction scenarios, with the change across all design events limited to less than -0.08m^3/s (3%) in the 1% AEP and less than 0.09m^3/s (5%) in the 50% AEP design flood events.
- There is similar consistency for the change in peak flows into Lot 148 on DY910 (reporting point PO43) with peak flow impacts ranging between 0.07m^3/s (15%) in the 50% AEP and 0.12m^3/s (13%) in the 20% AEP design flood events. This negligible increase in flow into Lot 148 on DY910 appears to be due to the constructed embankment along the southern table drain redirecting slightly more water in a north-westerly direction.
- The modelling shows peak post-developed flows approaching the dam on Lot 25 on DY577 (reporting point PO46) also remains consistent with pre-developed flows with negligible change in peak flow rates. Specifically, across all design events the change in peak flow ranges from 0.01m^3/s (<1%) in the 1% AEP to 0.06m^3/s (3%) in the 50% AEP design flood events.
- The modelling shows peak post-developed flows approaching the dam on Lot 148 on DY910 (reporting point PO61) are similarly consistent, with the change ranging between less than 0.07m^3/s (15%) in the 50% AEP and 0.02m^3/s (3%) in the 1% AEP design flood events.

The change in peak flow crossing the floodway (reporting point PO7) is also generally consistent between pre-construction and post-construction conditions across all design flood events, with the magnitude of change ranging between 0.02m^3/s (27%) in the 50% AEP and 0.07 m^3/s (5%) in the 1% AEP design flood events.

A more detailed description of the hydraulic modelling and commentary of lot-specific results is contained in the following sections.

4.5.2 Lot 148 on DY910

The flows entering Lot 148 on DY910 through the constructed channel marginally increase by between 0.09m^3/s in the 50% AEP and 0.12m^3/s in the 20% AEP design flood events.

The 1% AEP design flood shows a negligible change of 0.10m^3/s, whilst the frequent event (50% AEP design flood) similarly shows a negligible increase of 0.09m3/s through the diversion channel. The greatest increase in modelled flows is observed in the 20%AEP with a 0.12m^3/s change between the pre-construction flow of 0.88m^3/s and the post-construction flow of 1.00m^3/s. Increases are mostly attributed to the construction of the embankment along the northern property boundary of Lot 25 on DY577. This embankment essentially redirects a small portion of floodwater, which would otherwise enter Lot 25 on DY577, towards the diversion channel in Lot 148 on DY910 to minimise the impact of the upgrade project and ensure the flows to the diversion channel are maintained as far as practicable.

The small increase in the magnitude of the peak flow entering the property has resulted in a minor increase in net flood volume entering the property – based on the 24-hour modelling simulation period. The hydraulic modelling suggests increases in net volume entering Lot 148 on DY910 by 10.69% in the 50% AEP and 11.31% in the 5% AEP design flood events for the post-construction scenario.

Within the site and immediately upstream of the constructed earth dam, there is a minor increase in peak flow limited to between 0.01m^3/s in the 20 AEP to 0.07m^3/s in the 5% AEP design flood events. The relatively small increase in flow also translates to an overall minimal change in net flood volume through the constructed

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channel over the 24-hour simulation period. The modelling suggests the net volume received within the range of -12.74m^3 (-0.36%) in the 2% AEP and +227.32m^3 (+5.11%) in the 5% AEP design flood events. This demonstrates the Daandine-Nandi Road upgrade project generally has minimal impact on the flow and volume entering the dam at Lot 148 on DY910. Timeseries data for the flow at this location have been illustrated in Figure 4-4.

4.5.3 Lot 25 on DY577

The flows entering Lot 25 on DY577 through the diversion channel show minimal change between the pre-construction and post-construction flow regimes. There is a negligible decrease in the larger design flood events (1%, 2%, and 5% AEP) and small increase in the more frequent design flood events (10%, 20%, and 50% AEP). The change in peak flows through the constructed channel in all design flood events range between -0.08m^3/s in the 1% AEP to 0.10m^3/s in the 50% AEP design flood events. The largest relative change is modelled in the 50% AEP design flood event, with the pre-construction flows being 1.27m^3/s and the post-construction flows increasing by 0.1m^3/s to 1.37m^3/s.

The post-construction scenario concentrates the flow in the smaller design flood events, allowing the majority of flow to remain contained within the diversion channel – this fundamentally causes the flow through the channel to increase. The change in net flood volume entering the site through the diversion channel during the 24-hour simulation period is between +1.84% in the 1% AEP and +4.67% in the 20% AEP design flood events for the post-construction scenario.

Within the site and immediately upstream of the earth dam, the change in peak discharge is negligible, with the change in peak flow limited to a range of -0.02m^3/s in the 5% AEP to +0.06m^3/s in the 50% AEP design flood events. The relatively small change in flow also translates to an overall minimal change in net flood volume throughout the 24-hour simulation period. The hydraulic modelling suggests a change in net flood volume within the range of -0.23% (-64.87m^3) in the rare (1% AEP) design flood events to 0.20% (+57.21m^3) in the frequent (50% AEP) design floods.

This demonstrates the upgrade project generally has minimal impact on the flow and volume entering the dam within Lot 25 on DY577. Timeseries data for the flow at this location have been illustrated in Figure 4-5.

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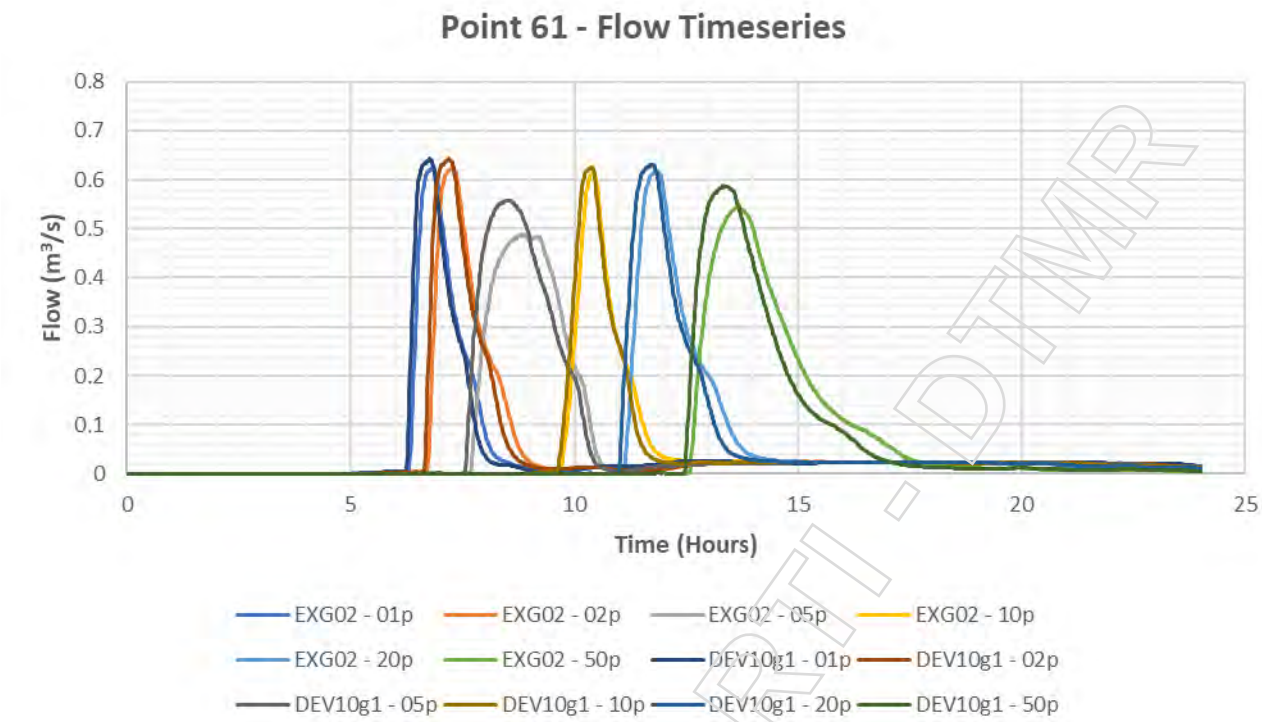


Figure 4-4 Point 61 Flow Timeseries

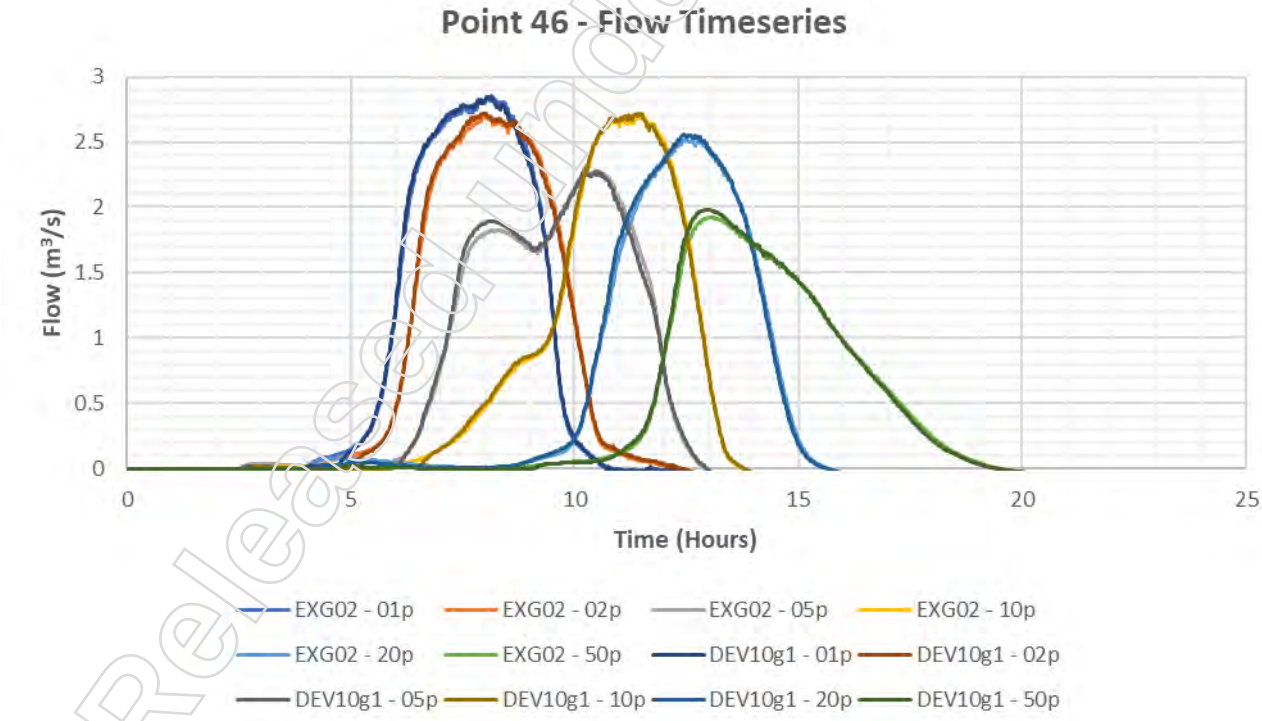


Figure 4-5 Point 46 Flow Timeseries

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4.6 Peak Flood Level and Velocity Comparisons

As previously noted, the change in flow regimes as a direct result of the Daandine-Nandi Road upgrade and minor modifications to the cross-drainage provisions in isolation to other external and unrelated topographic changes has also been assessed. This additional assessment has been undertaken using the August 2020 LiDAR-derived DEM as the base topography and includes the pre-development ground survey and proposed post-construction design surface.

This assessment has been undertaken to determine potential flood level and velocity changes between the pre- and post-construction modelling scenarios, and to ultimately assist in determining if these changes have the potential to negatively impact downstream properties. The flood level afflux and velocity difference mapping has been included in the figures as indicated below:

- Post-Development Flood Level Afflux (1% AEP) - Figure 4-6
- Post-Development Flood Level Afflux (50% AEP) - Figure 4-7
- Post-Development Flood Velocity Difference (1% AEP) - Figure 4-8
- Post-Development Flood Velocity Difference (50% AEP) - Figure 4-9

Additionally, the full suite of flood level afflux and velocity difference mapping for the remaining 2%, 5%, 10%, and 20% AEP design flood events are attached in Appendix B.

A further summary of the peak flood levels and flood level afflux at various key locations are provided in Table 4-3.

Additionally, flood level timeseries for the pre- and post-construction scenarios for all design flood events at the locations of the dam on Lot 148 on DY910 (Point 61) and Lot 25 on DY577 (Point 46) have also been included in the figures as indicated below:

- Lot 148 on DY910 (Point 61) Flood Level Timeseries - Figure 4-10
- Lot 25 on DY577 (Point 46) Flood Level Timeseries - Figure 4-11

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Figure 4-6 Post-Development Flood Level Afflux (1% AEP)



Figure 4-7 Post-Development Flood Level Afflux (50% AEP)

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Figure 4-8 Post-Development Flood Velocity Difference (1% AEP)



Figure 4-9 Post-Development Flood Velocity Difference (50% AEP)

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Table 4-3 Flood Level Summary

Reporting Location	Scenario	01 % AEP	02% AEP	05% AEP	10% AEP	20% AEP	50% AEP
Flood Level (mAHD)							
Point 46	Existing	327.01	326.97	326.92	326.85	326.79	326.64
	Developed	327.01	326.97	326.92	326.85	326.79	326.64
Point 61	Existing	326.49	326.48	326.48	326.47	326.47	326.43
	Developed	326.49	326.49	326.49	326.48	326.47	326.43
Point 5	Existing	327.36	327.33	327.31	327.27	327.23	327.14
	Developed	327.37	327.35	327.32	327.28	327.22	327.08
Point 38	Existing	327.13	327.10	327.07	327.05	327.03	327.00
	Developed	327.14	327.11	327.07	327.02	327.00	327.00
Point 102	Existing	327.40	327.38	327.36	327.32	327.28	327.24
	Developed	327.40	327.38	327.35	327.31	327.27	327.23
Point 42	Existing	326.96	326.96	326.95	326.94	326.93	326.84
	Developed	326.96	326.96	326.95	326.94	326.94	326.86
Point 43	Existing	326.97	326.96	326.95	326.94	326.93	326.88
	Developed	326.97	326.96	326.96	326.95	326.94	326.88
Change in Flood Level (m)							
Point 46	Developed - Existing	0.00	0.00	0.00	0.00	0.00	0.00
Point 61		0.01	0.01	0.01	0.01	0.01	0.00
Point 5		0.02	0.02	0.02	0.01	-0.01	-0.06
Point 38		0.01	0.01	0.00	-0.03	0.00	0.00
Point 102		-0.01	-0.01	-0.01	-0.02	-0.01	0.00
Point 42		0.00	0.00	0.00	0.00	0.01	0.02
Point 43		0.00	0.00	0.00	0.01	0.01	0.00

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4.7 Summary of Results - Peak Flood Level and Velocity Comparisons

4.7.1 Overview

The change in peak flood levels at various locations across the hydraulic model show the difference in peak water level and velocity between pre- and post-construction scenarios is minimal, with the largest decrease across all reporting points being -0.052m at Point 5 in the frequent (50% AEP) design flood event and the largest increase across all reporting points being 0.016m at Point 5 in the rare (1% AEP) design flood event.

Minor increases in flood levels are observed on Lot 148 on DY910 across all design flood events, with isolated instances of both minor increases and minor decreases in flood levels modelled on either side of Daandine-Nandi Road across all design flood events.

Similarly, there are isolated instances of changes in flood velocity adjacent to the road upgrade works which generally accord with the flood level results. Maps showing the change in velocity across each of the assessed design flood events are presented separately in Appendix C Flood Impact Mapping.

4.7.2 Lot 148 on DY910

The peak flood levels within the diversion channel entering Lot 148 on DY910 remain generally consistent between the pre- and post-construction scenarios, with the greatest changes observed to be 0.007m in the 20% AEP design flood event. Of note, there is no change (+0.000m) in flood level in the 1% AEP design flood event at this location.

Further north where a majority of the flood level afflux is observed, the modelling shows flood level increases in the 1% AEP design event range between 0.01m and 0.02m, with isolated instances of increases up to 0.050m along the site's eastern boundary. In the smaller 50% AEP design event, flood level increases are mostly observed to occur within the diversion channels of up to 0.02m.

Modelling of the post-construction works indicates potential increases in flood velocity across Lot 148 on DY910 of between 0.025m/s to 0.15m/s across all design flood events. There are isolated instances of flood velocities increases up to 0.2m/s along the site's eastern-most boundary but these are isolated to relatively small areas.

At the location of the dam, the change in peak flood levels are minimal and range between 0.004m in the 50% AEP design flood and up to 0.009m in the 10% AEP design flood event. The increases for the remaining design flood events are generally between 0.006m and 0.007m at the same location. Timeseries data for the flood levels at this location have been illustrated in Figure 4-10.

4.7.3 Lot 25 on DY577

The peak flood levels within the constructed channel entering Lot 25 on DY577 remain generally consistent between the pre- and post-construction scenarios, with the greatest changes observed to be 0.015m in the 50% AEP design flood event. Of note, the larger, rarer design flood events (1%, 2%, 5%, and 10% AEP) do not experience material changes in flood levels (less than 0.002m) at the same location.

Further south into Lot 25 on DY577 there are increases and decreases in flood levels downstream of the outer bank of the proposed table drain. Similarly, modelling of the post-construction indicate isolated, immaterial changes to flood velocity along the northern-most boundary of Lot 25 on DY577.

Lot 25 on DY577 experiences a combination of increases and decreases in flood levels and velocities; the increases are observed where the floodwater flows around the outer bank of the proposed table drain, whereas the decreases are observed directly downstream the constructed outer bank of the proposed table drain.

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At the location of the dam, the change in peak flood levels are minimal and range between 0.001m in the 5%, 10%, and 20% AEP design flood events and up to 0.002m in the 1%, 2%, and 50% AEP design flood events. This demonstrates negligible change in peak flood levels at this location as a result of the upgrade project. Timeseries data for the flood levels at this location have been illustrated in Figure 4-11.

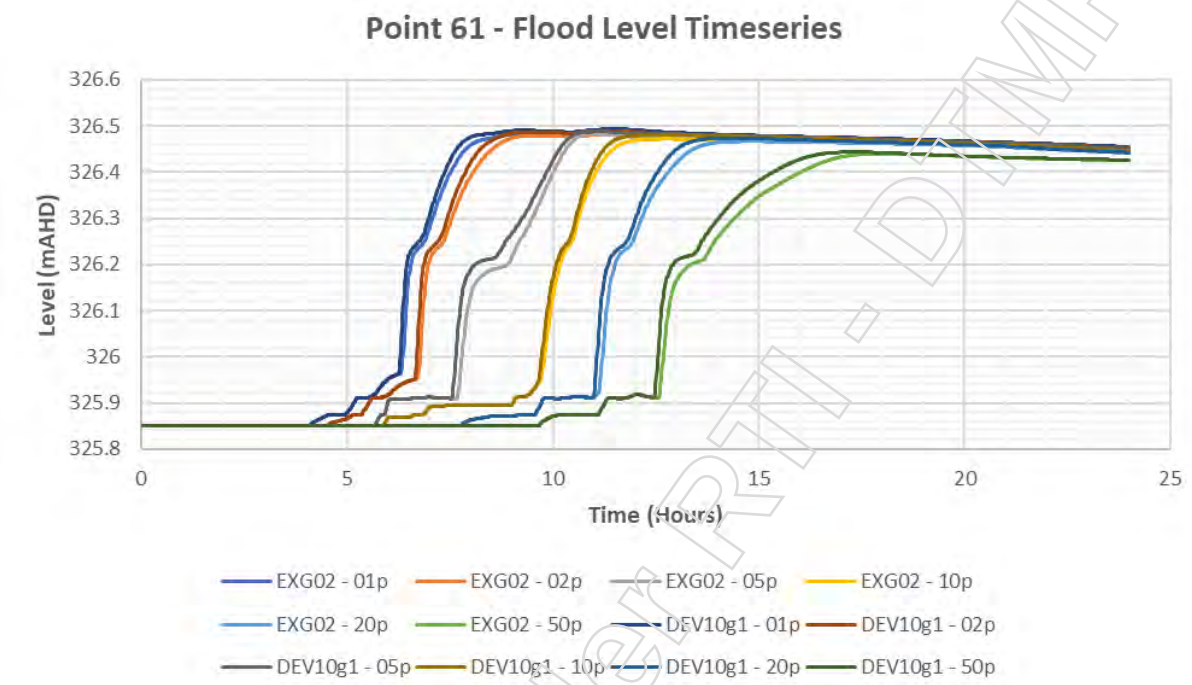


Figure 4-10 Point 61 Flood Level Timeseries

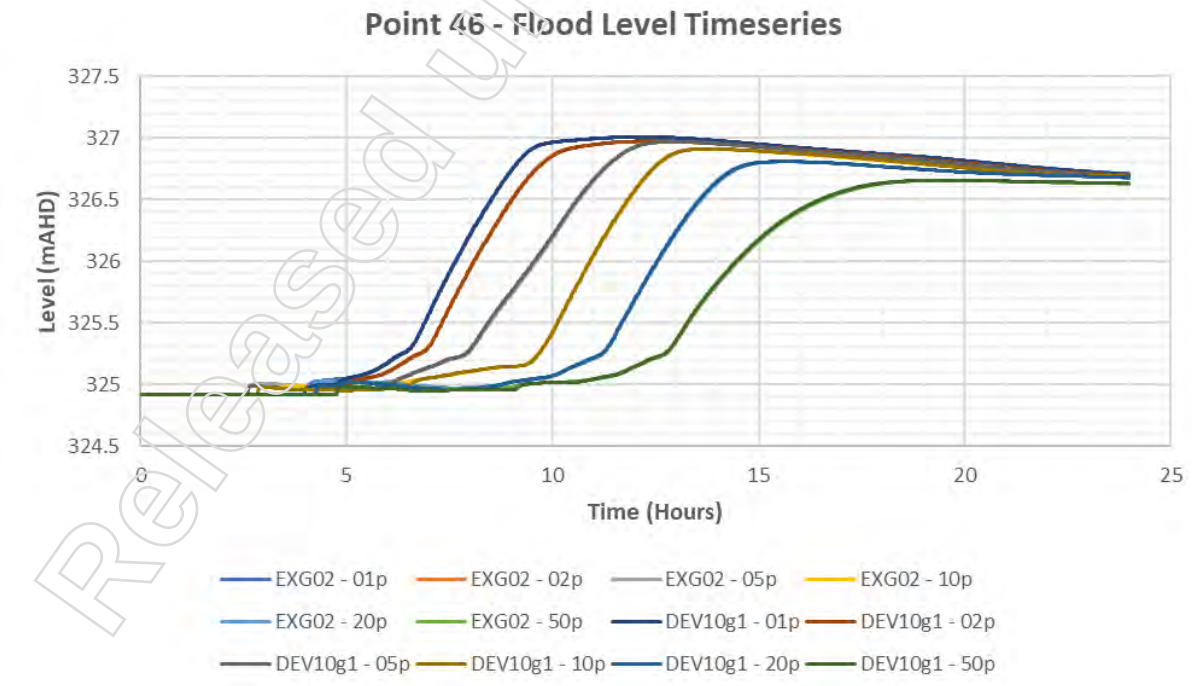


Figure 4-11 Point 46 Flood Level Timeseries

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5 HISTORIC LIDAR DATASET COMPARISON

Between each of the historic LiDAR datasets, there are notable differences in the representation of the roadway and the channelisation of roadside channels and other key topographic features; all of these changes affect the flooding regimes and can ultimately influence the peak flood levels and depths across the hydraulic modelling domain. The gradual changes in ground level over time between each of the historic LiDAR datasets are presented in the figures as indicated below:

- Change in Ground Level (2012 to 2014) - Figure 5-1
- Change in Ground Level (2014 to 2020) - Figure 5-2
- Change in Ground Level (2020 to 2021) - Figure 5-3

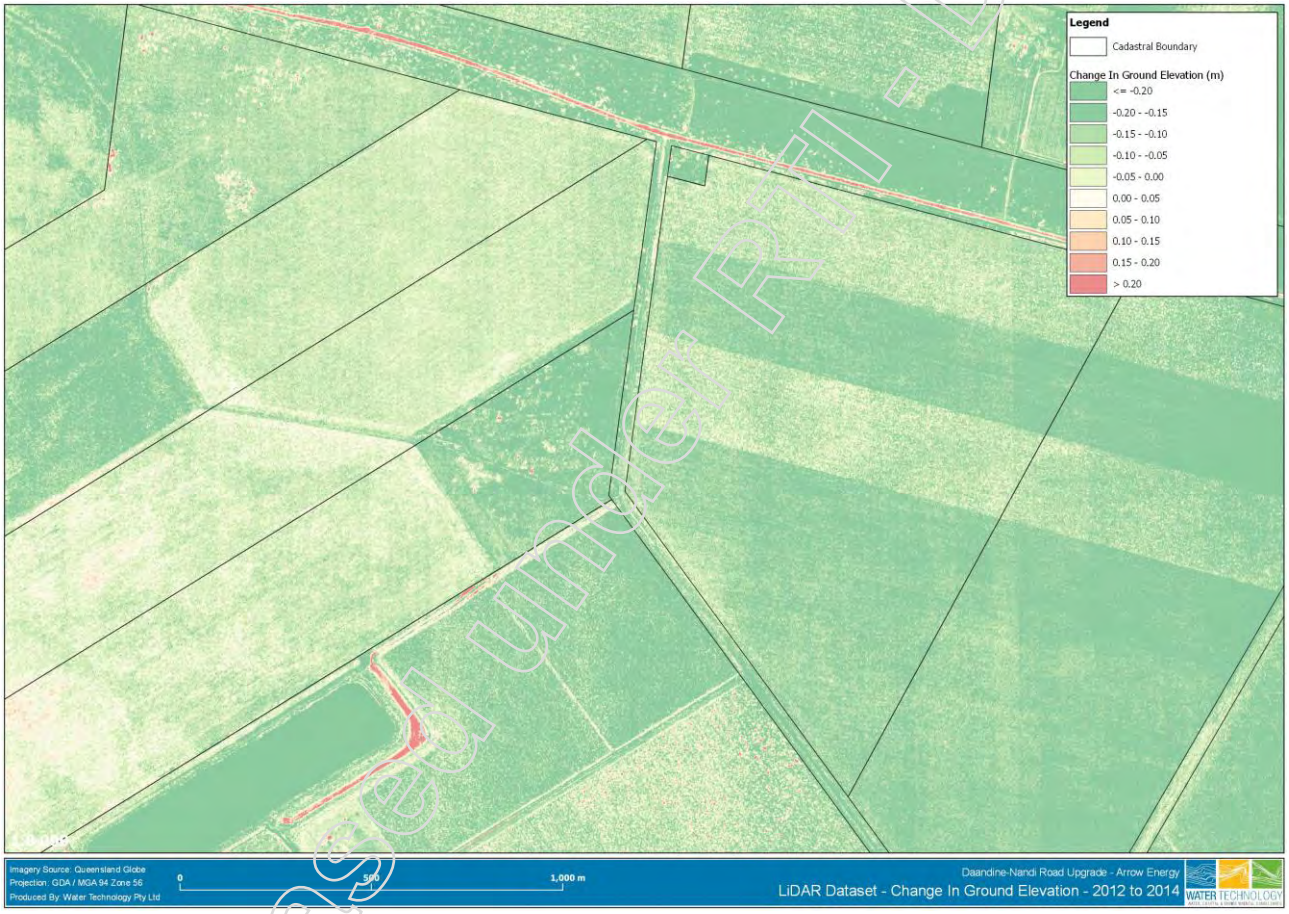


Figure 5-1 LiDAR Dataset – Change in Ground Elevation (2012 to 2014)

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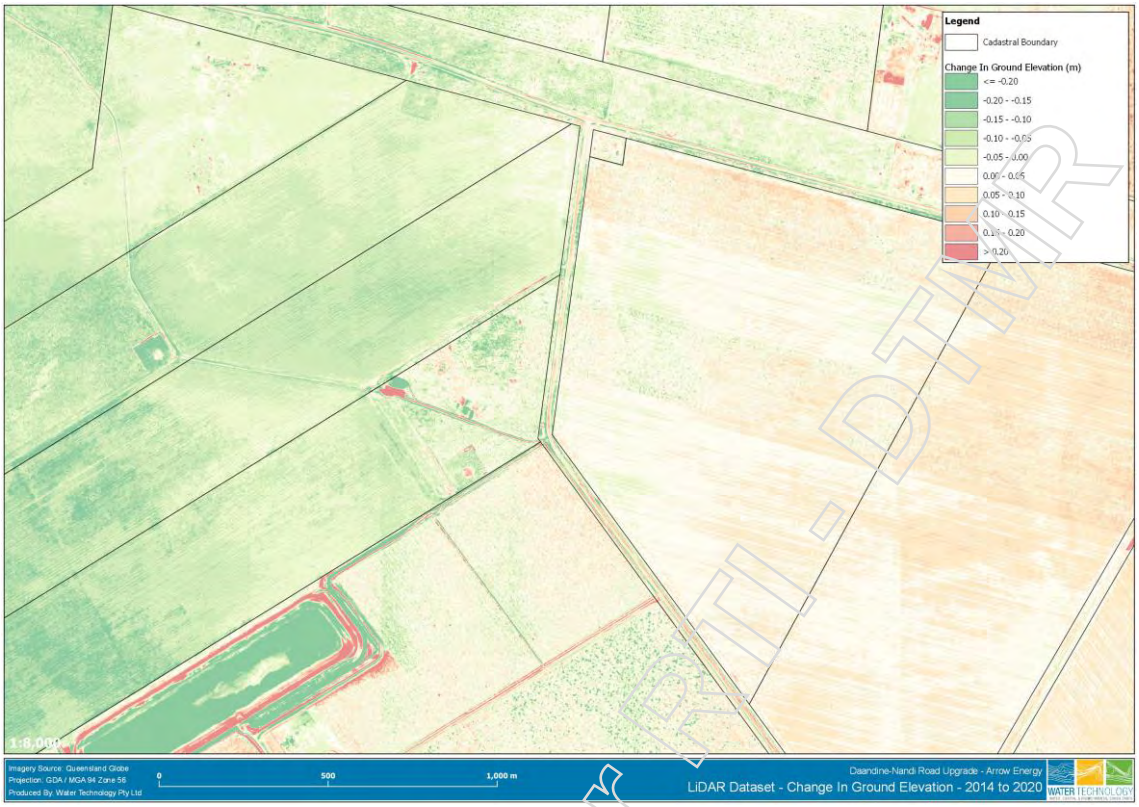


Figure 5-2 LiDAR Dataset – Change in Ground Elevation (2014 to 2020)



Figure 5-3 LiDAR Dataset – Change in Ground Elevation (2020 to 2021)

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A summary of the ground levels at various reporting points are provided in Table 5-1 below. The locations of these reporting points are illustrated in Figure 5-4.

Table 5-1 Historic LiDAR Dataset – Ground Level Summary (mAHD)

Label	LiDAR (2012)	LiDAR (2014)	LiDAR (2020)	LiDAR (2021)
5	326.98	326.92	326.96	327.08
38	327.12	326.88	327.01	327.03
42	326.17	326.18	326.27	326.22
43	327.07	326.96	326.86	326.90
46	325.46	325.72	324.91	326.20
61	326.35	325.90	326.25	326.36
102	327.38	327.20	327.21	327.24



Figure 5-4 Reporting Point Locations

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6 SUMMARY

This report provides a summary of results from the extensive hydraulic modelling undertaken to inform the flood impact assessment of the Daandine-Nandi Road Stage 1 Upgrade project.

Water Technology has developed a detailed 1D/2D hydraulic model for the local catchment, which has been used to assess flood behaviour in the vicinity of the upgrade project and determine the potential hydraulic impacts for the full range of possible flood events up to the 1%AEP flood event, including the following design flood events:

- 1% AEP;
- 2% AEP;
- 5% AEP;
- 10% AEP;
- 20% AEP; and
- 50% AEP.

We understand the upgrade project is intended improve the serviceability of Daandine-Nandi Road including maintaining cross-drainage conditions which are consistent with the pre-upgraded conditions.

Following the development of a base case (pre-construction) hydrodynamic model, the proposed (post-construction) scenario was assessed to quantify the potential impact of peak flood level, peak flow, and flood volume. The proposed culvert arrangement includes one (1) 1200mm by 450mm RCBC with upstream and downstream inverts being 326.655mAHD and 326.567mAHD, respectively.

The hydraulic modelling has been prepared using TUFLOW, a 1D/2D hydrodynamic software capable of assessing flooding, surface water and drainage. TUFLOW is industry standard modelling recognised for its accuracy, speed, and workflow efficiency. TUFLOW is the preferred hydrodynamic software under the Department of Transport and Main Roads Hydrologic and Hydraulic Modelling Guidelines (DTMR, 2019). The hydraulic modelling conclude the proposed works would result in the following impacts to flooding characteristics.

Table 6-1 Flood impacts

Flooding Characteristic	Impact Values	Assessment against Flood Impact Objective (FIO)
Flood Level Impact	Generally, less than 50mm, with up to 100mm in isolated areas of undeveloped, agricultural land.	Achieves FIOs
Flood Velocity	Generally, less than 0.1 m/s external of the road reserve.	Achieves FIOs
Peak Flow	Less than 1% reduction to peak flow in the 1%AEP flood event and a 3% increase in peak flow in the more frequent events at the entrance to the head ditch.	Achieves FIOs
Flood Volume	Post-construction flood event volume is impacted by up +/- 0.2% of the pre-construction volume.	Achieves FIOs

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The impact values summarised above for peak flow and flood volume represent the lower limit of the tolerable differences within the hydraulic model in accordance with the recorded industry guidelines and reference material. For the purpose of this assessment, these values are considered to demonstrate non-worsening in flow characteristics, in comparison to the pre-construction conditions modelled.

Overall, the modelling indicates Lot 148 on DY910 has negligible impacts to peak flood levels, peak flow, volume, and velocity. Similar negligible flood impacts have been modelled across Lot 25 on DY577.

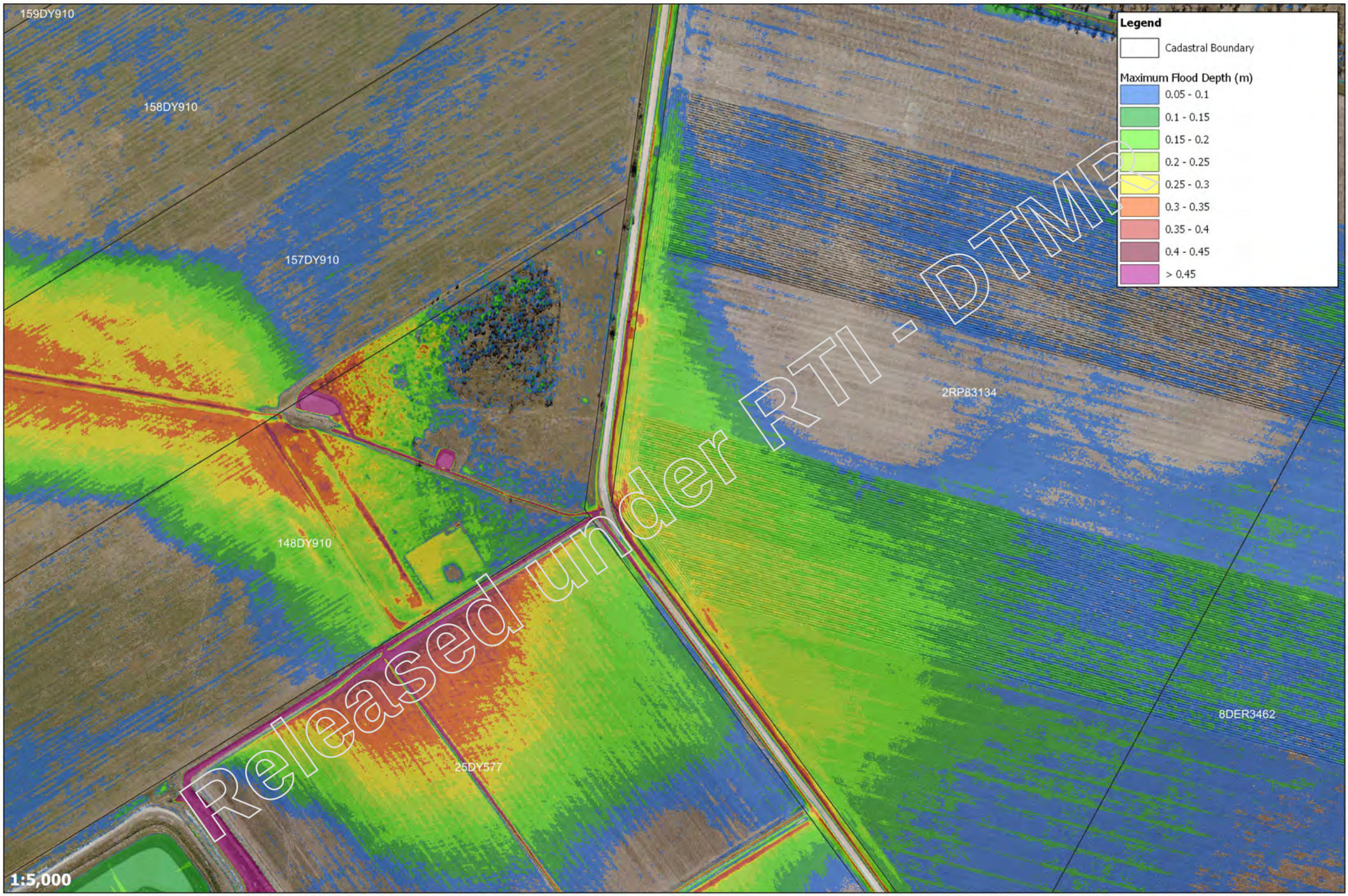
Consequently, the proposed alignment and associated earthworks are considered to demonstrate no material change to existing flood behaviour or pose an actionable nuisance across the range of modelled flood events. As such, this study demonstrates the outcomes of the flood assessment are consistent with the intent to ensure 'no net worsening' on existing flood behaviour.

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APPENDIX A
PRE-CONSTRUCTION FLOOD MAPPING

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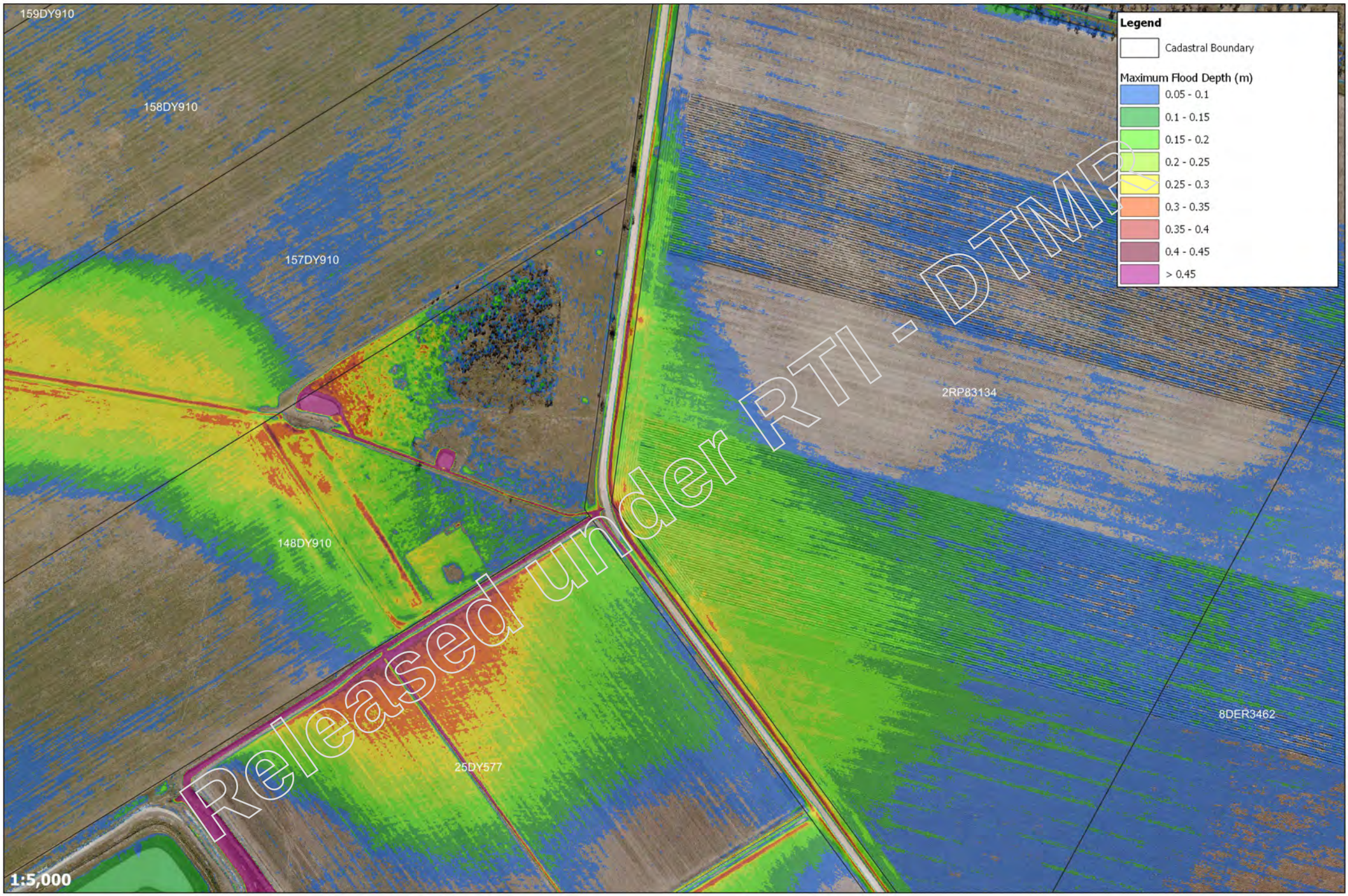


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Depth - 01% AEP

WATER TECHNOLOGY

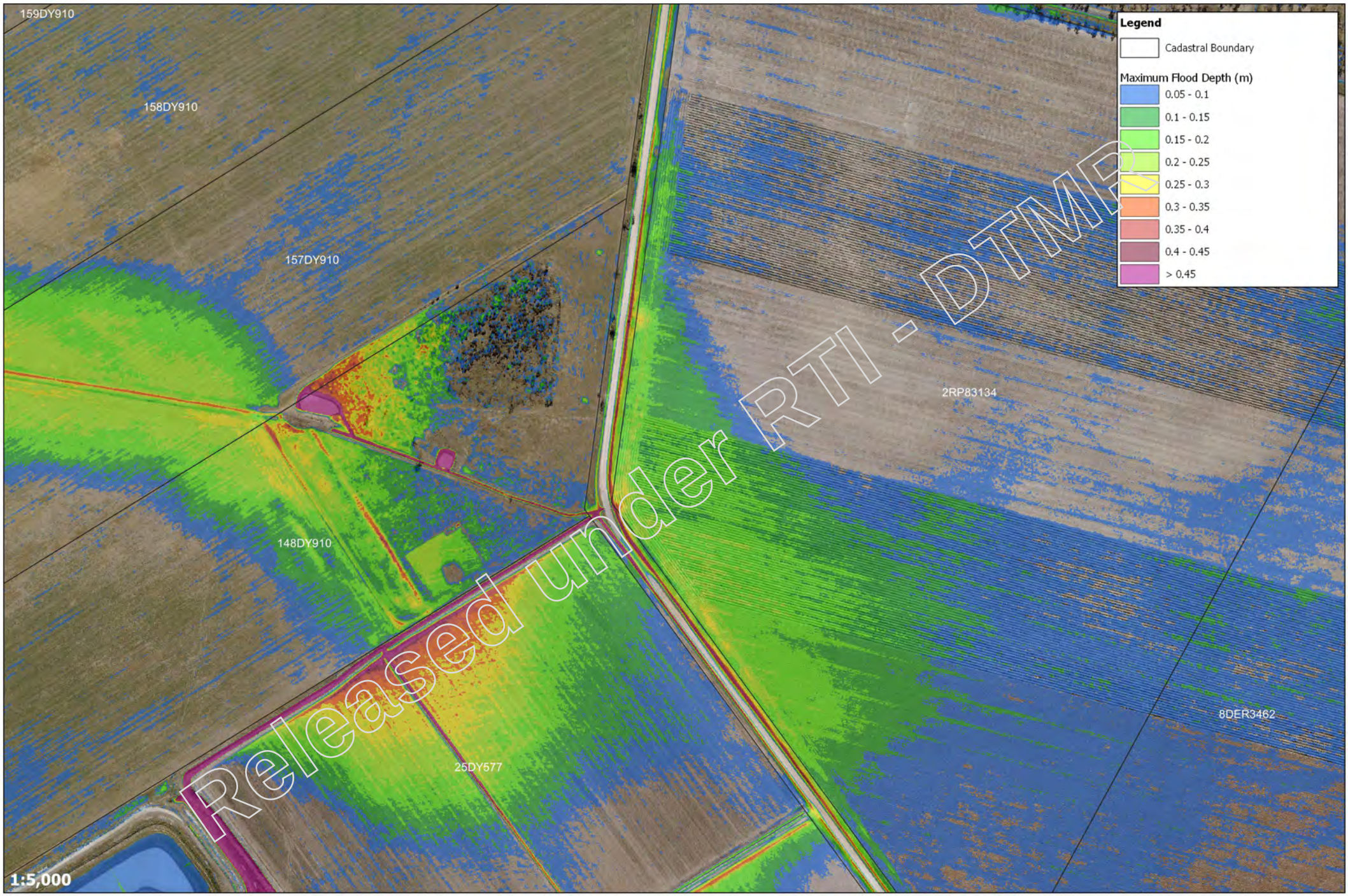


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Depth - 02% AEP

WATER TECHNOLOGY

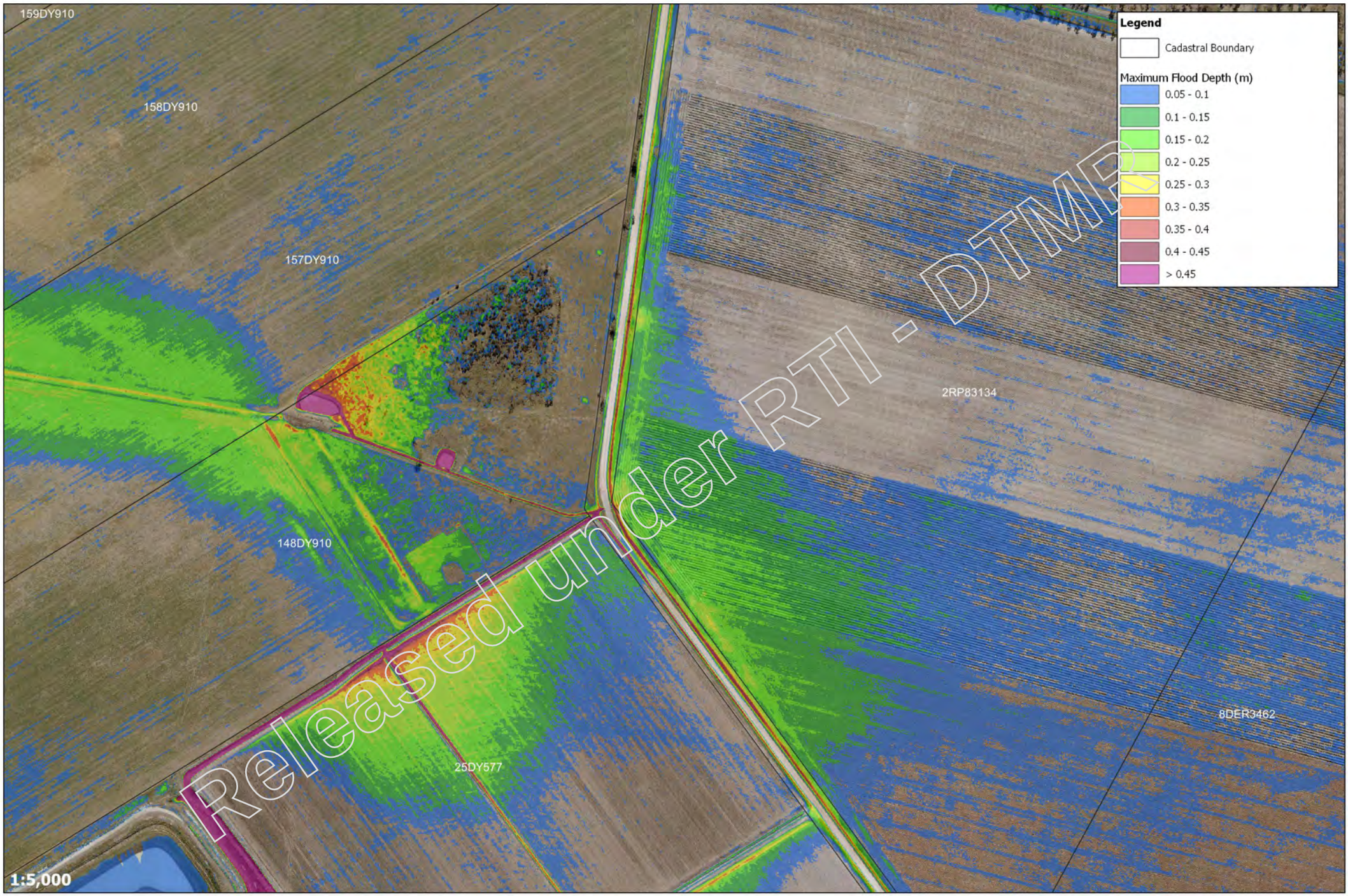


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Depth - 05% AEP

WATER TECHNOLOGY

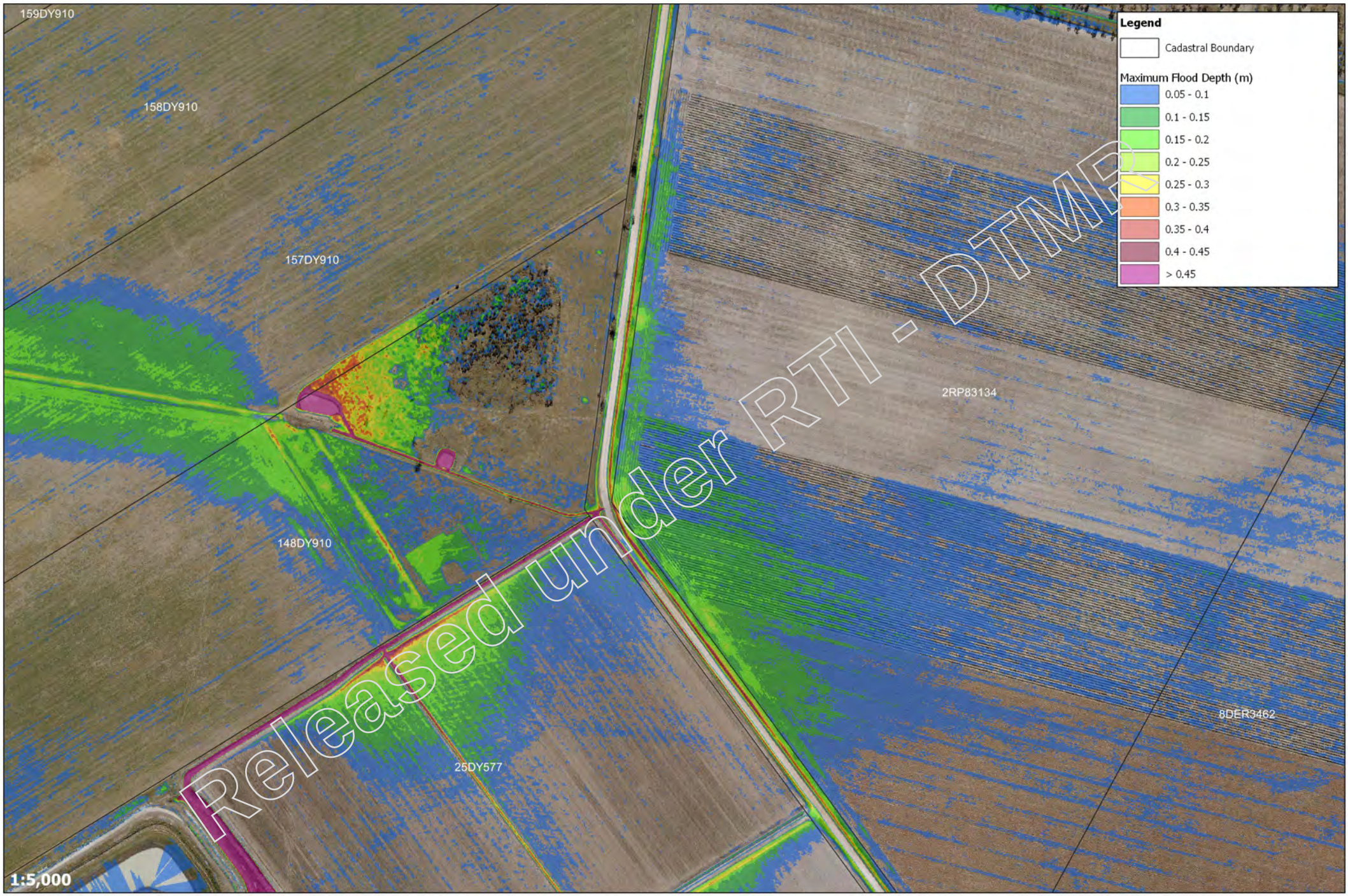


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Produced By: Water Technology Pty

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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Depth - 10% AEP

WATER TECHNOLOGY

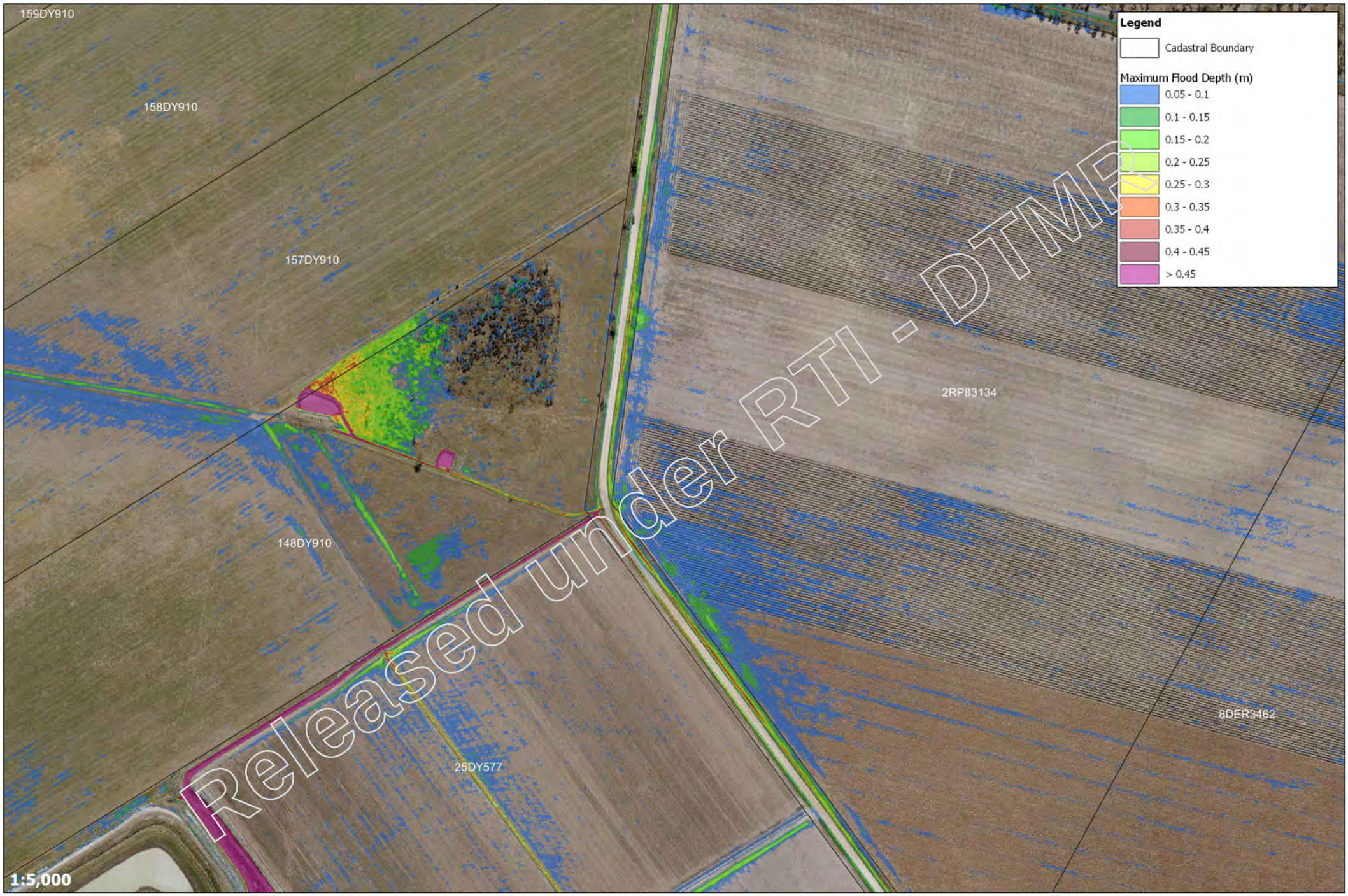


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Depth - 20% AEP

WATER TECHNOLOGY



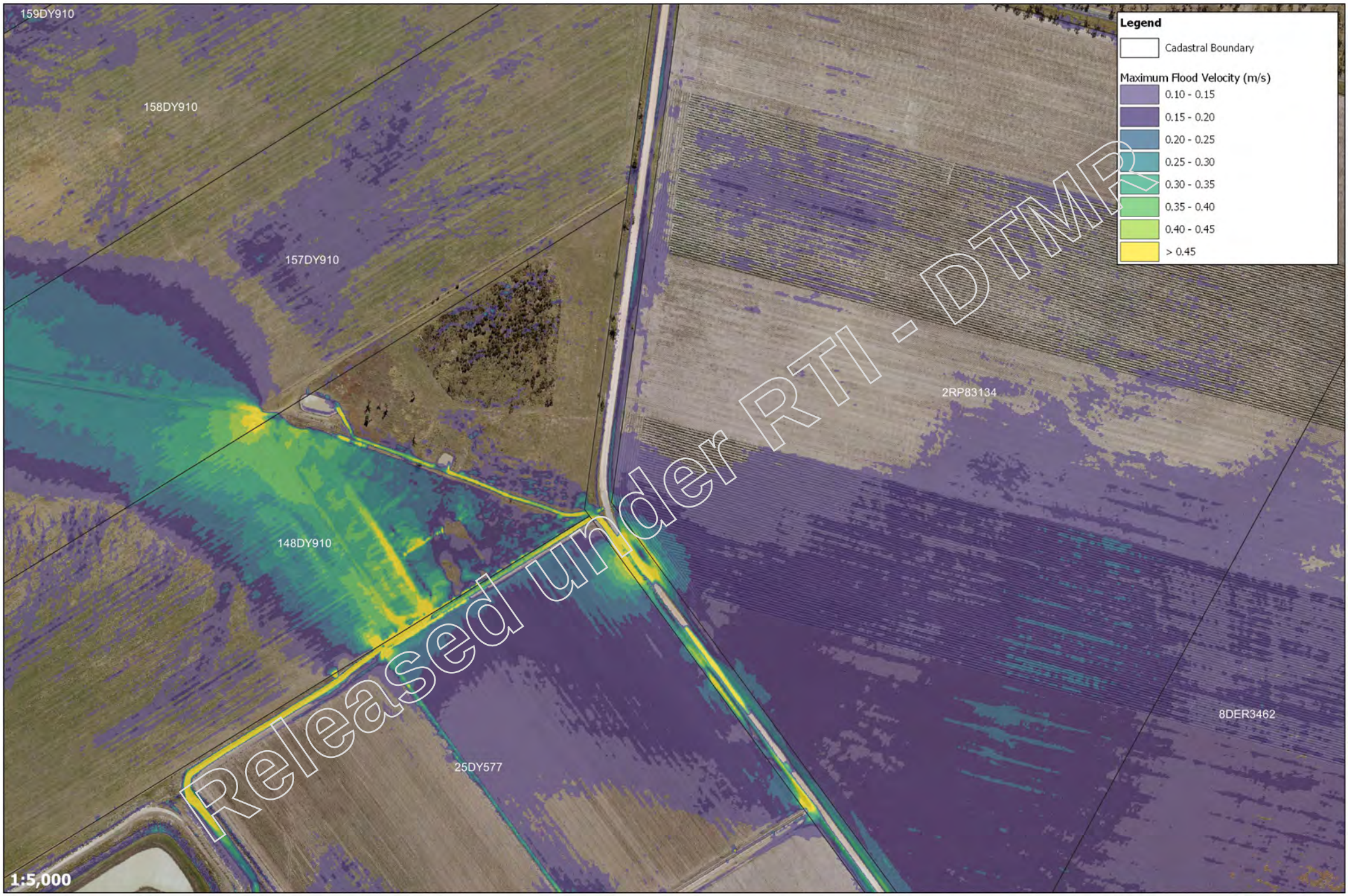
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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Depth - 50% AEP

WATER TECHNOLOGY



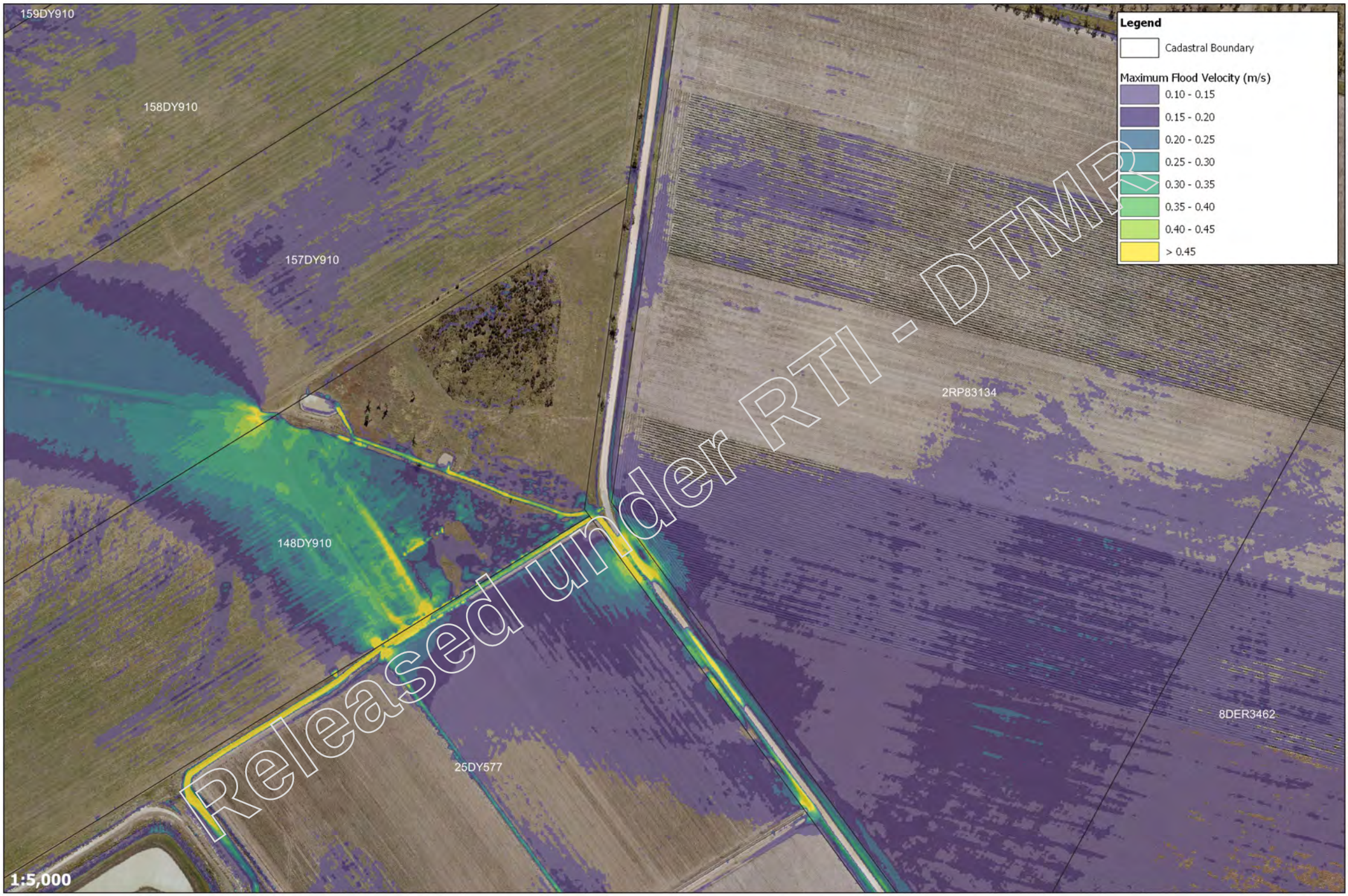
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Produced By: Water Technology Pty

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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 01% AEP

WATER TECHNOLOGY



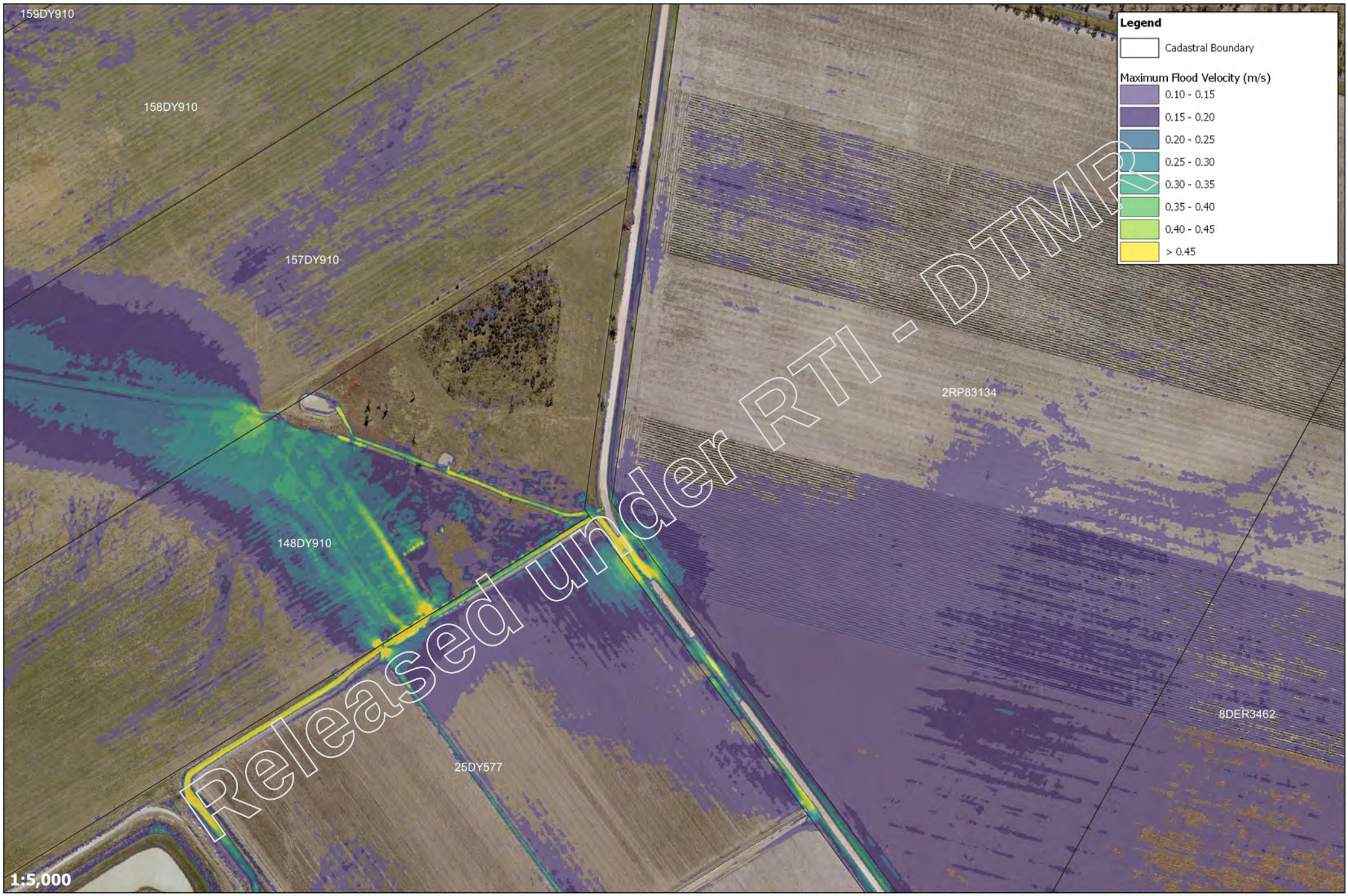
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Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 02% AEP

WATER TECHNOLOGY



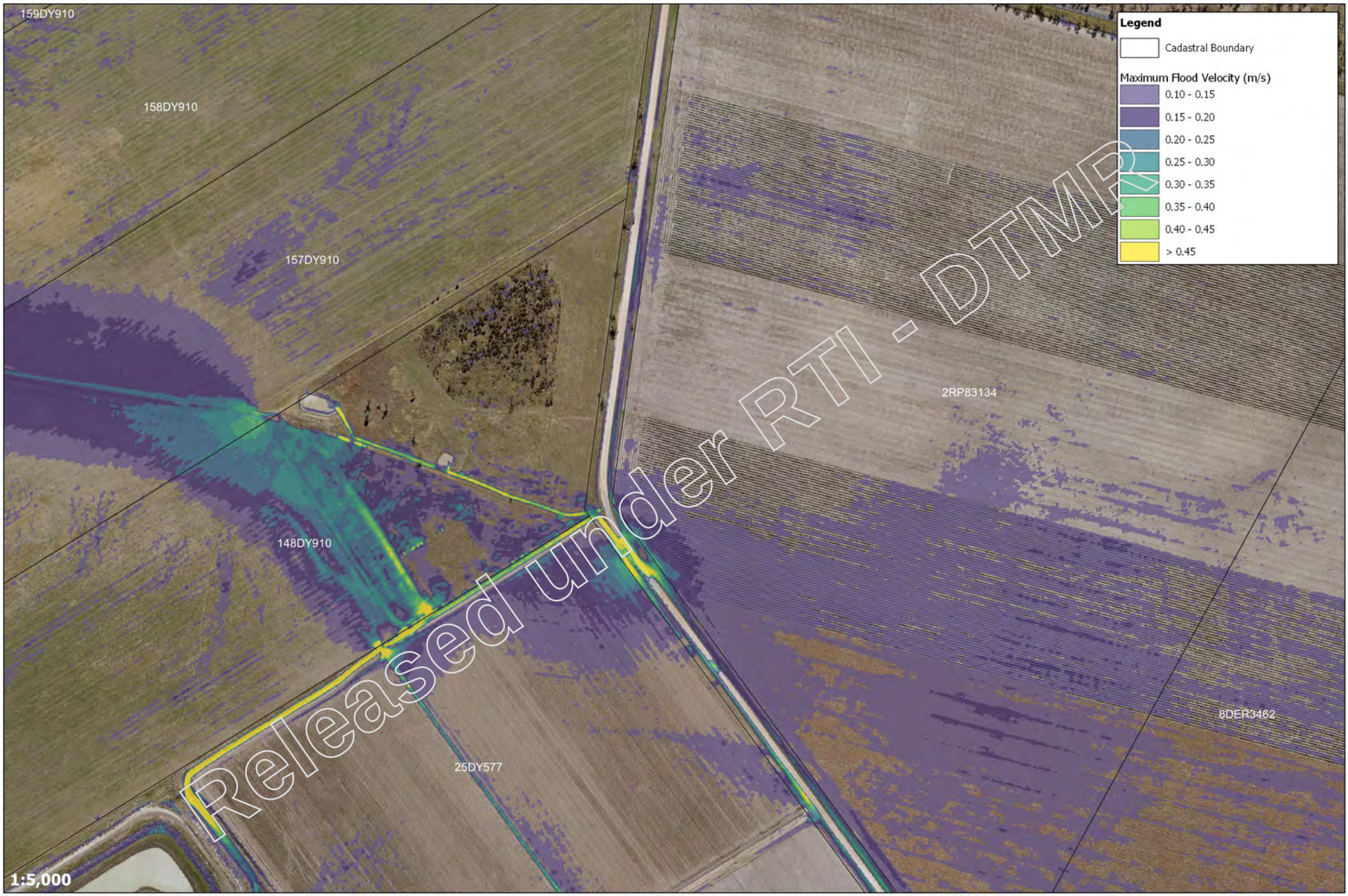
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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 05% AEP

WATER TECHNOLOGY



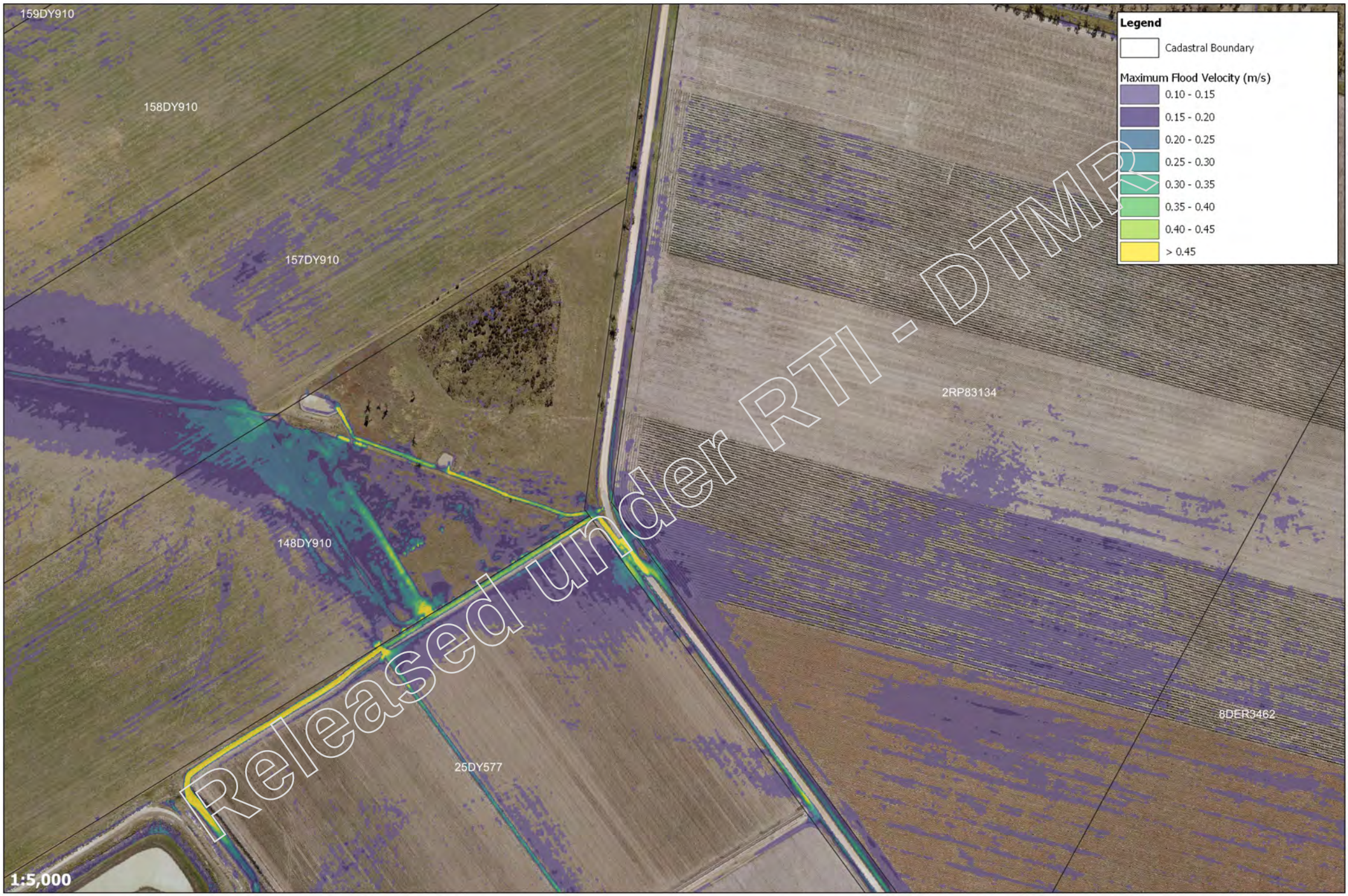
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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 10% AEP

WATER TECHNOLOGY



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Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 20% AEP

WATER TECHNOLOGY



Released under RTI - DTMR

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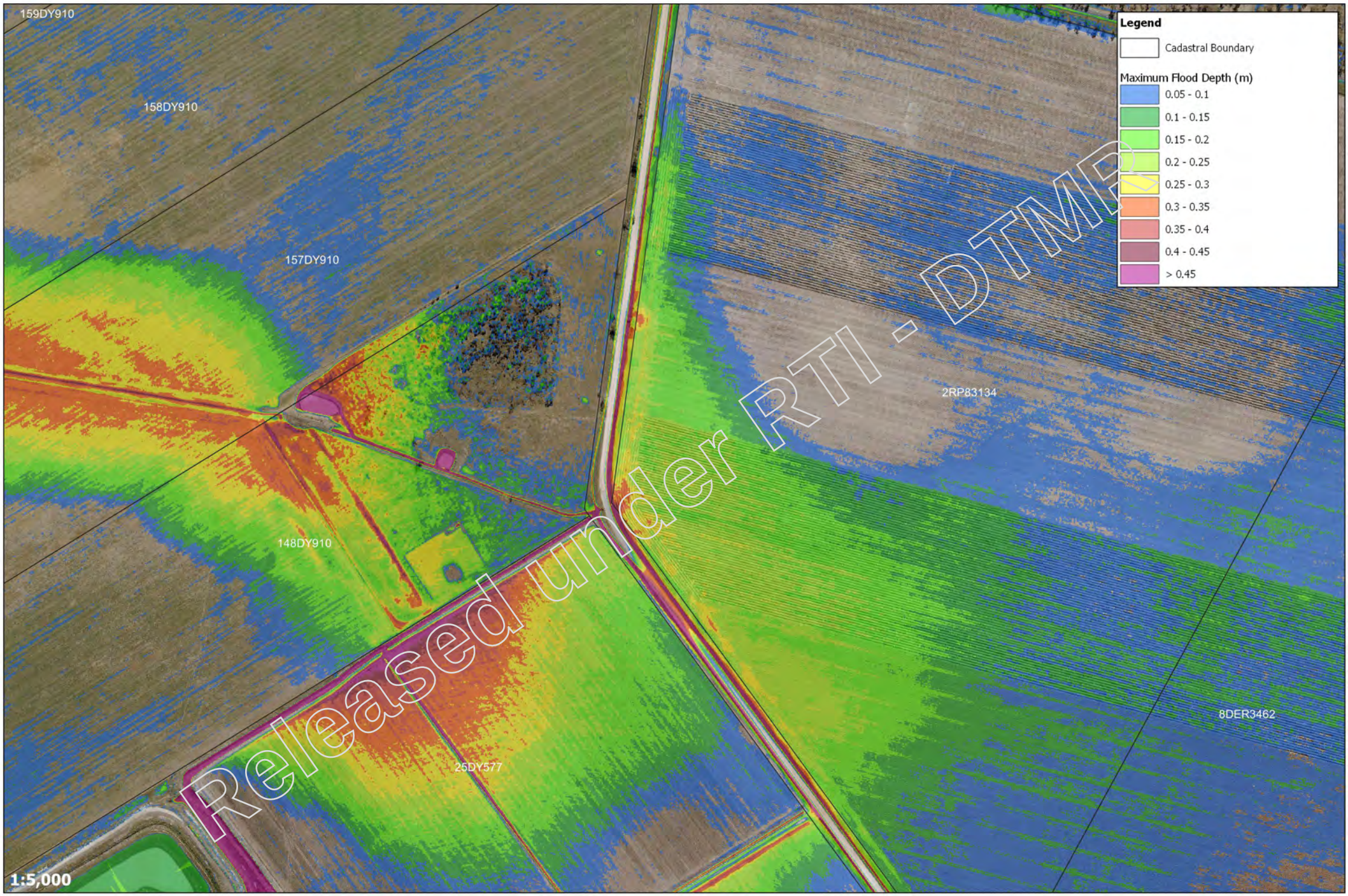
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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 50% AEP

WATER TECHNOLOGY

APPENDIX B
POST-CONSTRUCTION FLOOD MAPPING

Released under RTI - DTMR

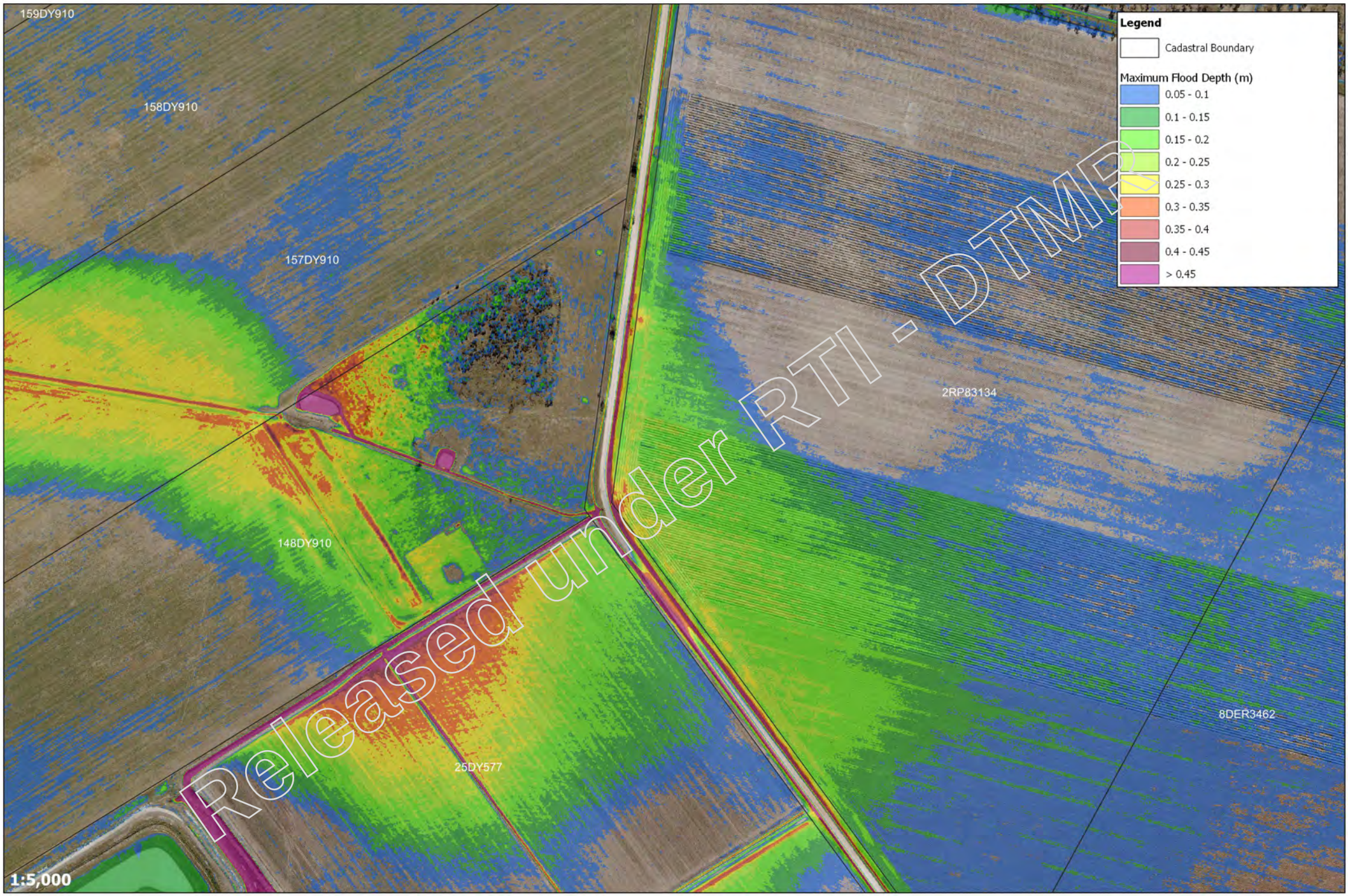


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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Depth - 01% AEP

WATER TECHNOLOGY



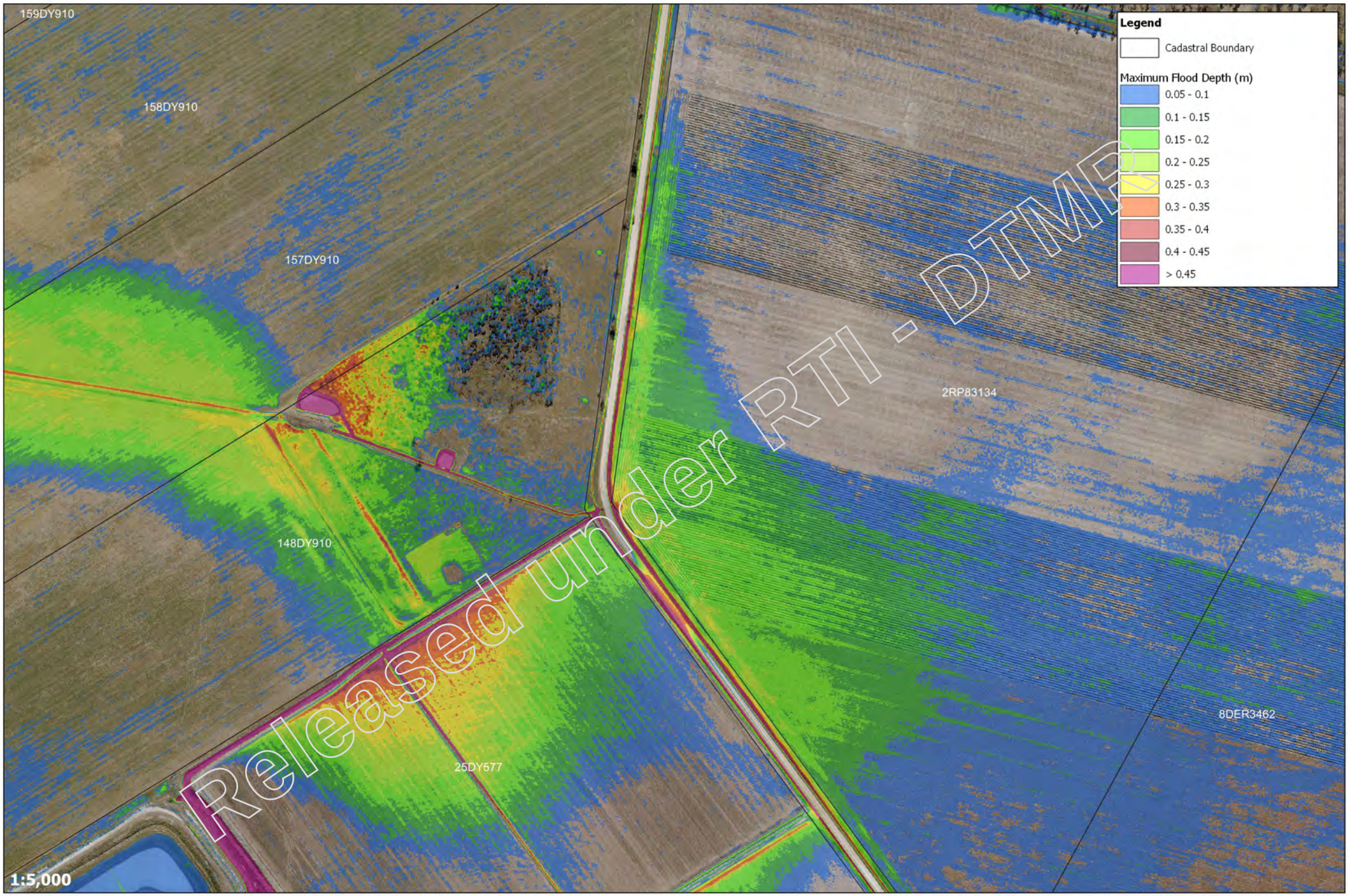
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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Depth - 02% AEP

WATER TECHNOLOGY

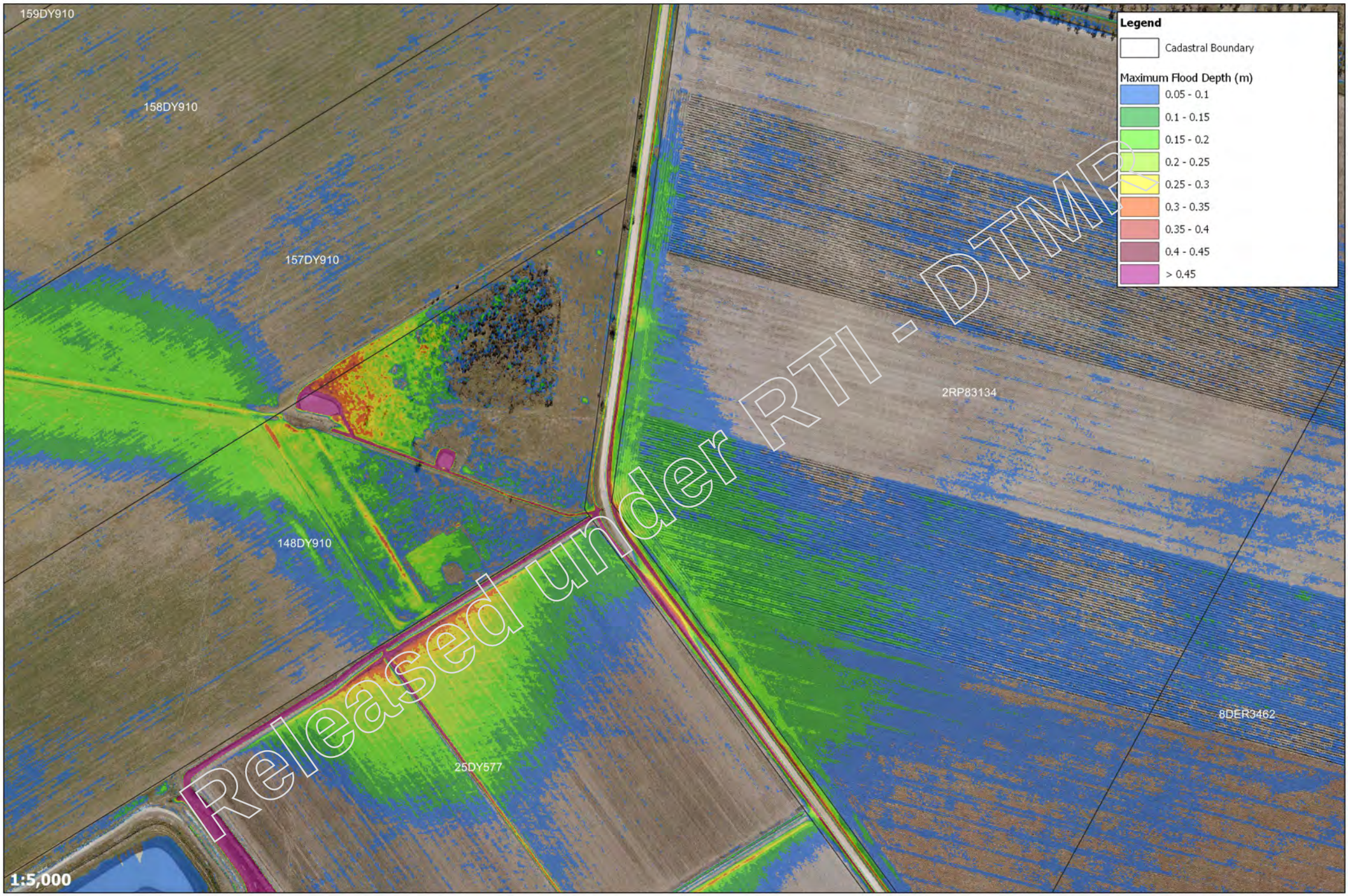


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Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Depth - 05% AEP

WATER TECHNOLOGY

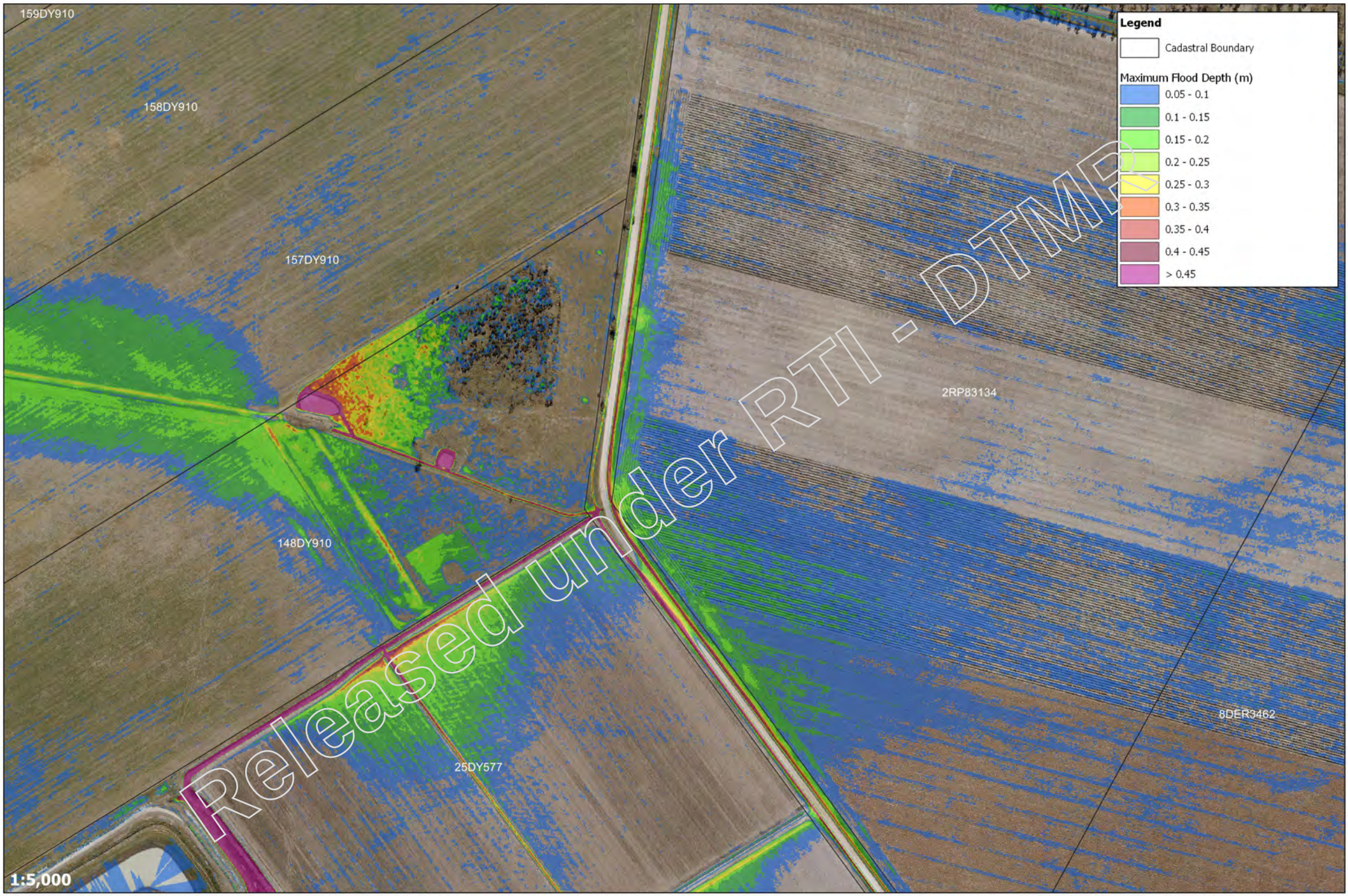


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Produced By: Water Technology Pty

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Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Depth - 10% AEP

WATER TECHNOLOGY

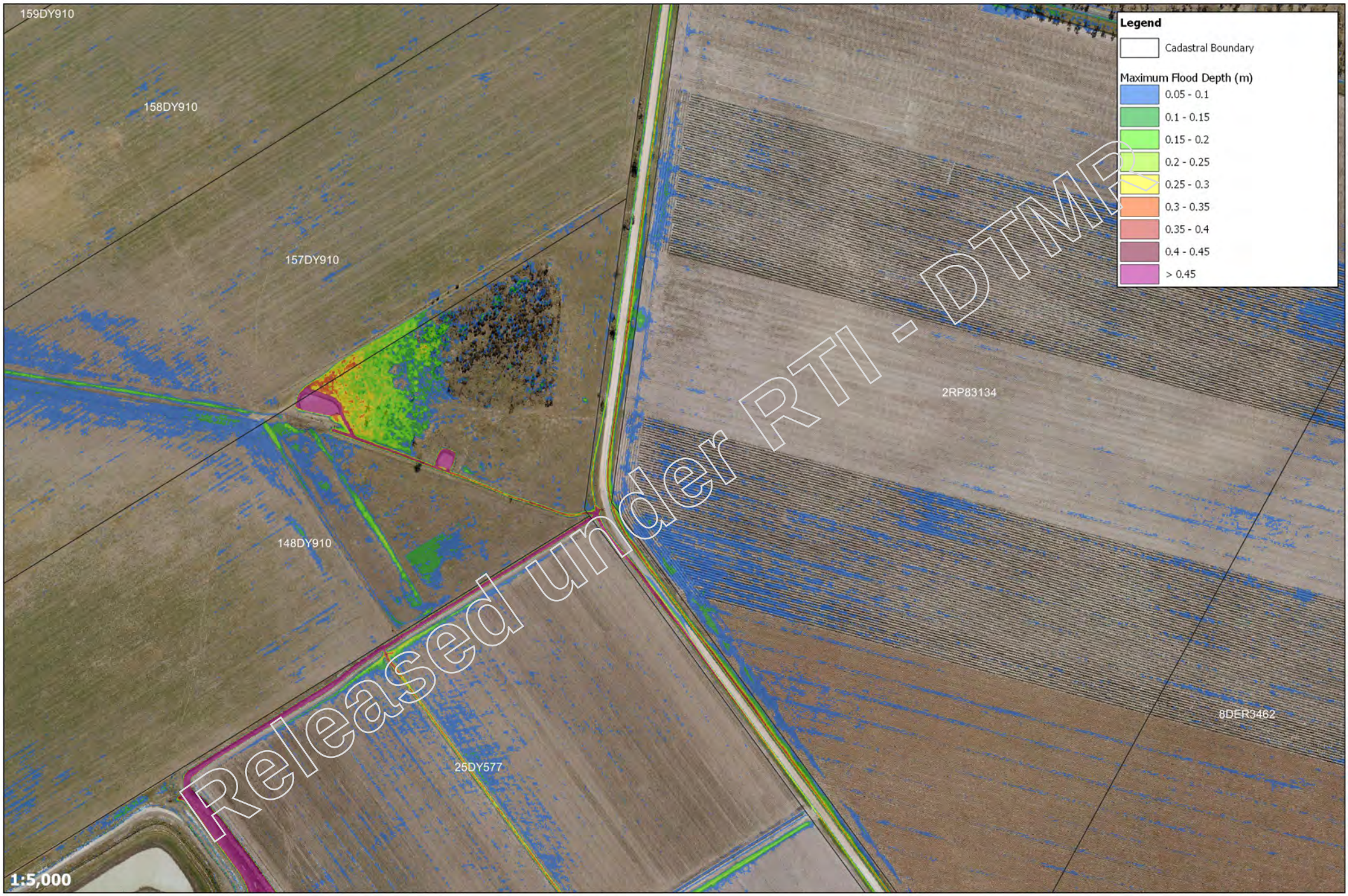


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Depth - 20% AEP

WATER TECHNOLOGY



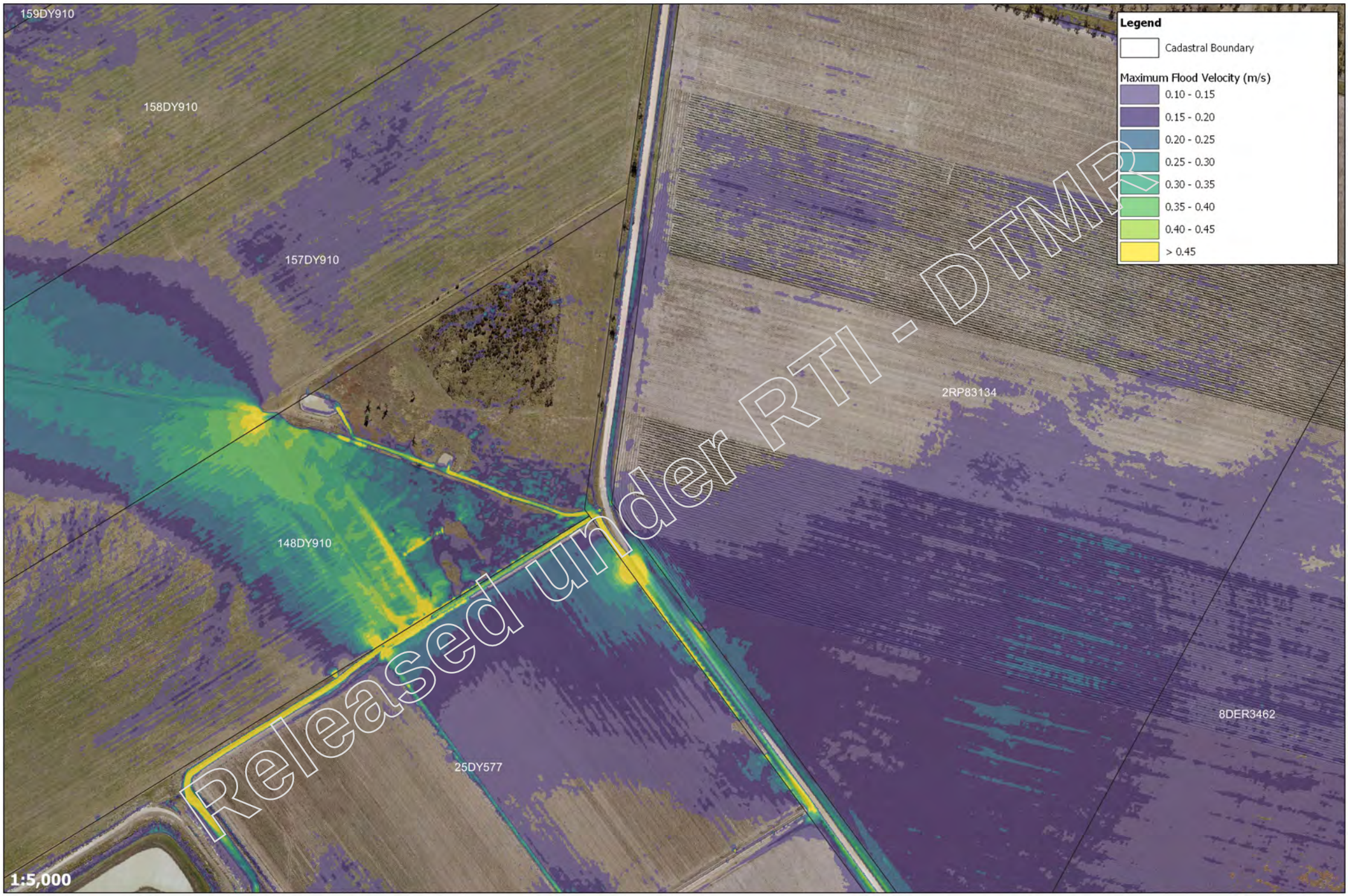
Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Depth - 50% AEP

WATER TECHNOLOGY



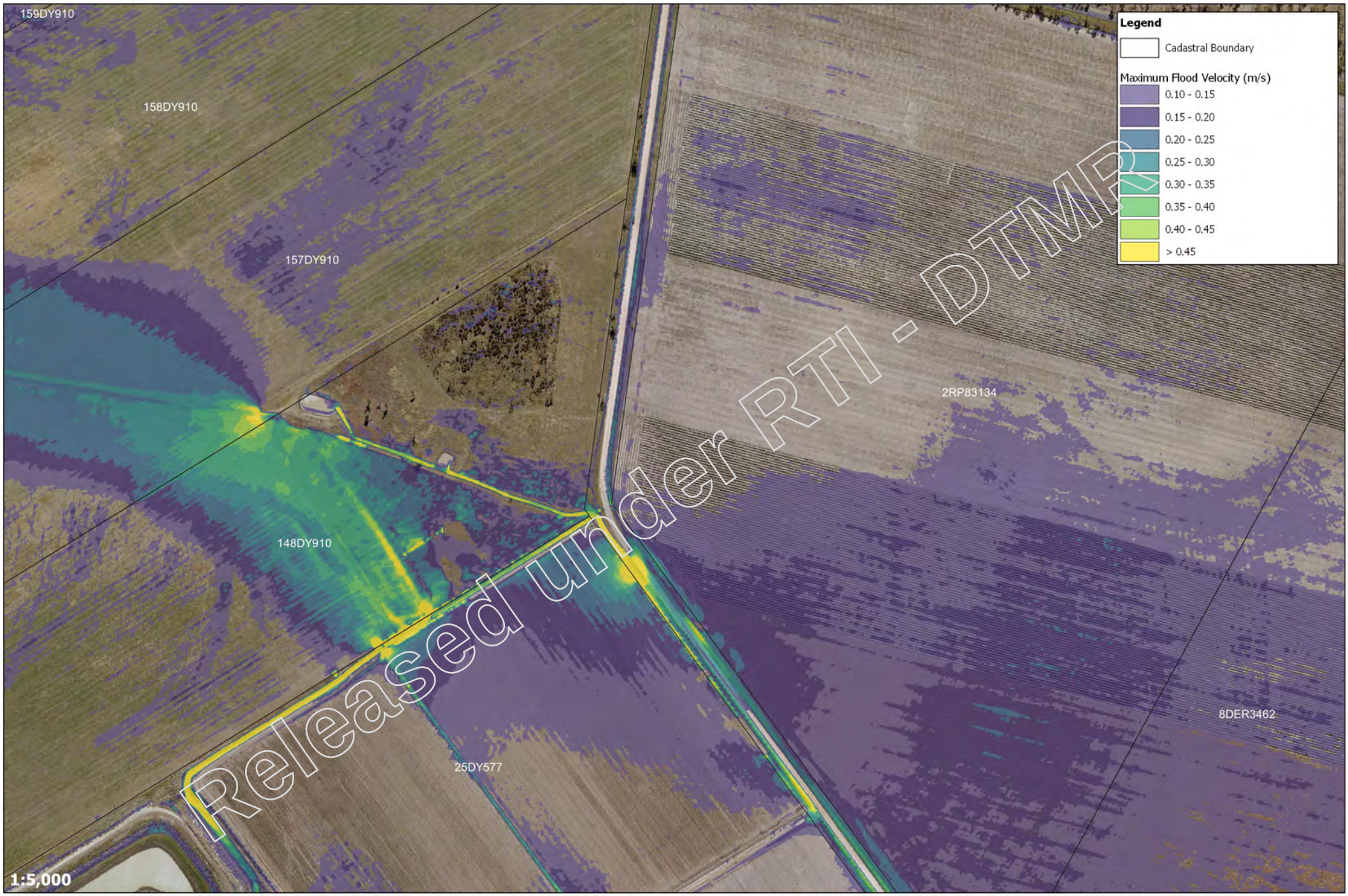
Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 01% AEP

WATER TECHNOLOGY



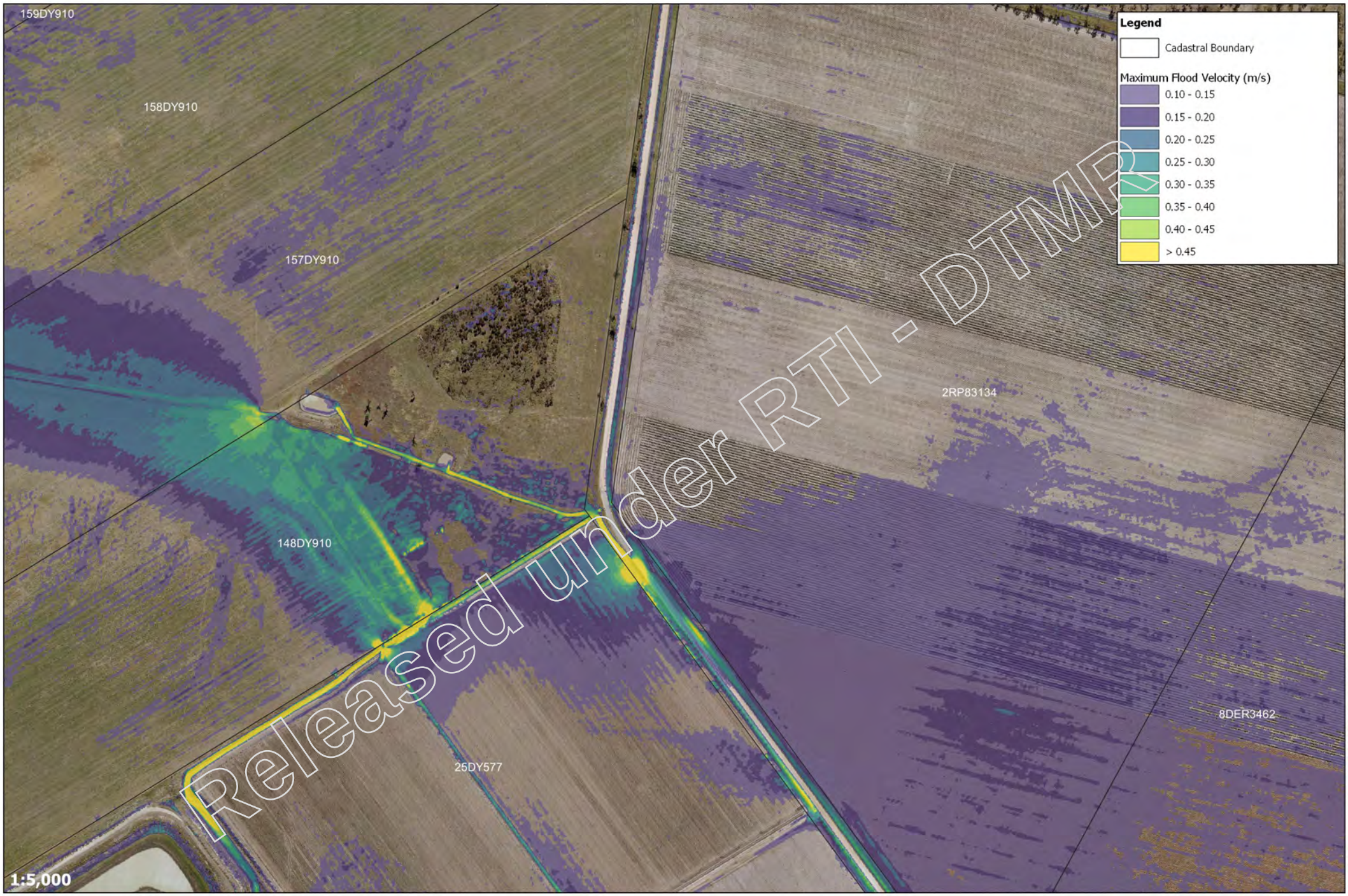
Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 02% AEP

WATER TECHNOLOGY



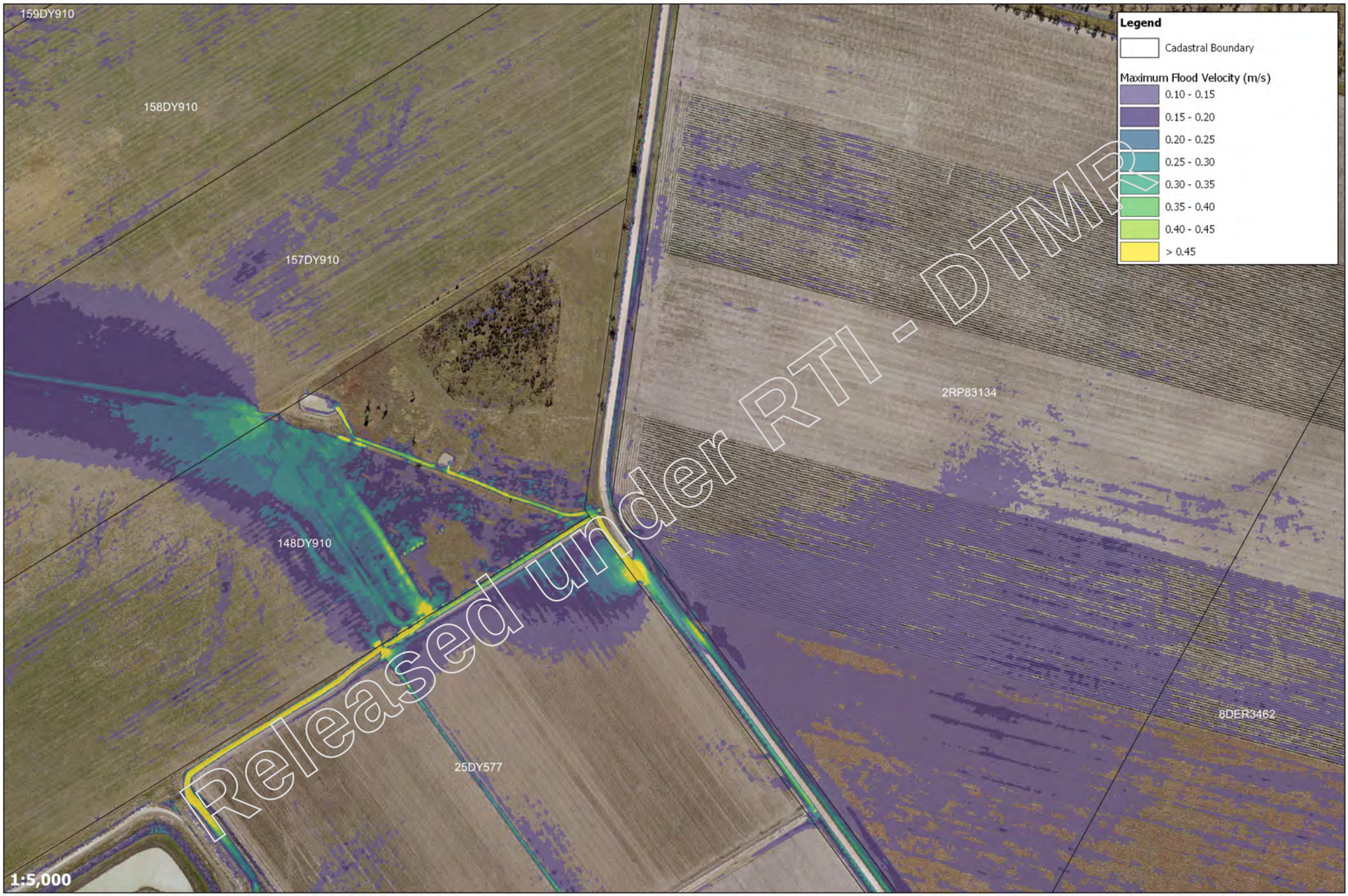
Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 05% AEP

WATER TECHNOLOGY

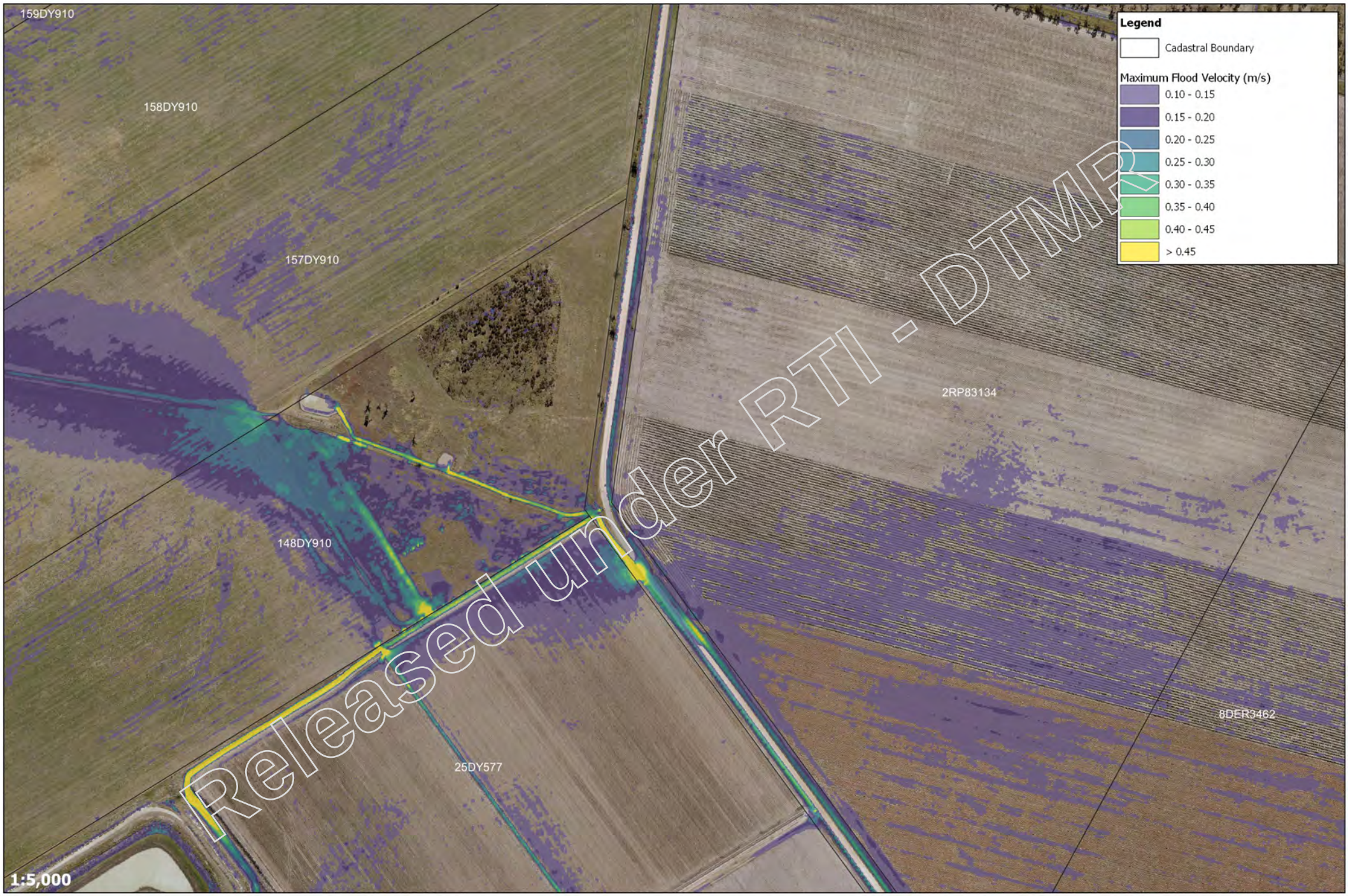


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 10% AEP

WATER TECHNOLOGY



Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 20% AEP

WATER TECHNOLOGY



Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 50% AEP

WATER TECHNOLOGY

APPENDIX C
FLOOD IMPACT MAPPING

Released under RTI - DTMR



Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Level Afflux - 01% AEP

WATER TECHNOLOGY



Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Level Afflux - 02% AEP

WATER TECHNOLOGY



Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Level Afflux - 05% AEP

WATER TECHNOLOGY



Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Level Afflux - 10% AEP

WATER TECHNOLOGY



Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Level Afflux - 20% AEP

WATER TECHNOLOGY



Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Level Afflux - 50% AEP

WATER TECHNOLOGY



Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity Difference - 01% AEP

WATER TECHNOLOGY



Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity Difference - 02% AEP

WATER TECHNOLOGY



Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity Difference - 05% AEP

WATER TECHNOLOGY



Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity Difference - 10% AEP

WATER TECHNOLOGY



Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity Difference - 20% AEP

WATER TECHNOLOGY



Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

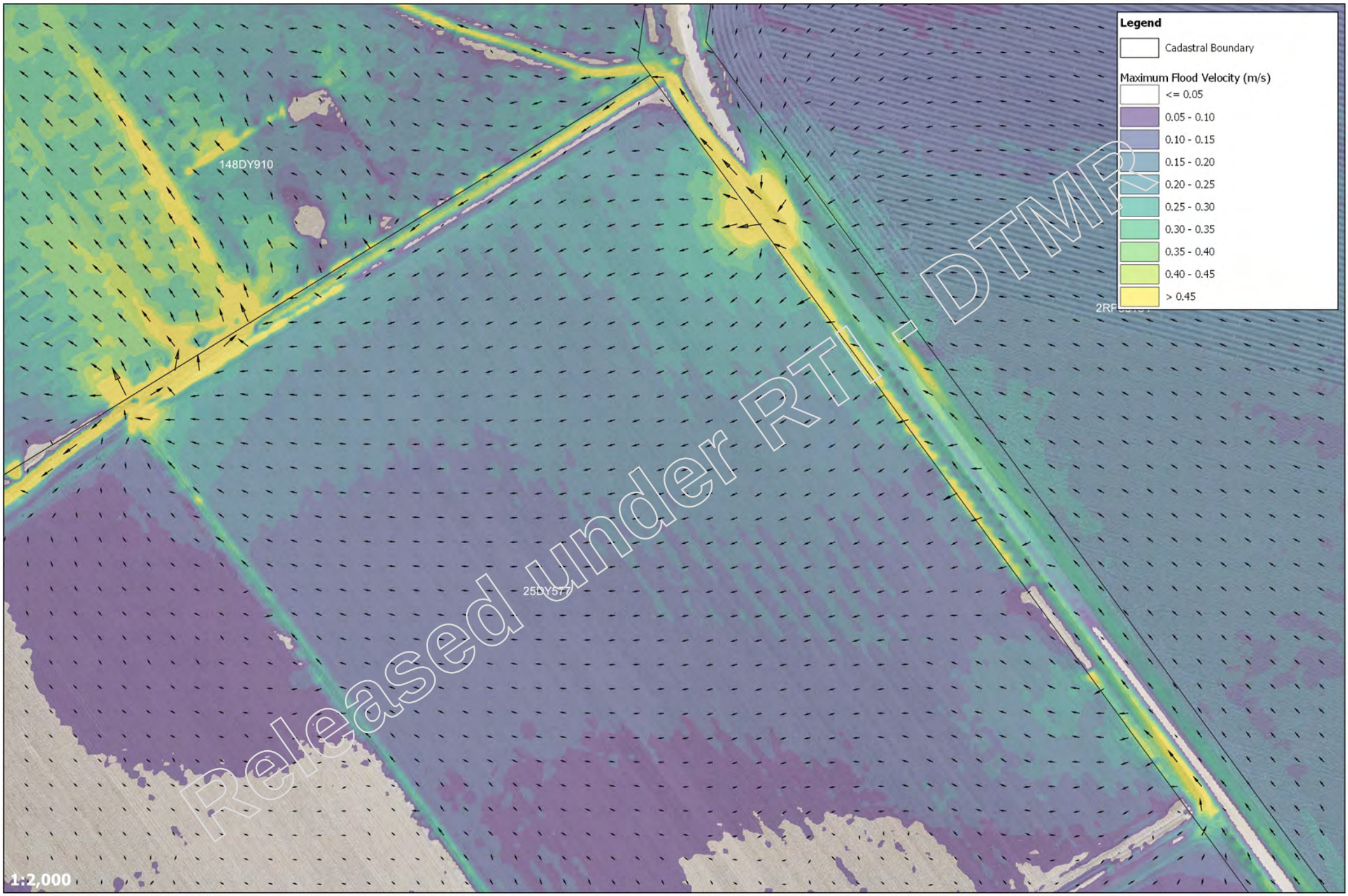
0 100 200 m

Daandine-Nandi Road Upgrade - Arrow Energy
LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity Difference - 50% AEP

WATER TECHNOLOGY

APPENDIX D
SUPPLEMENTARY VELOCITY VECTOR MAPPING

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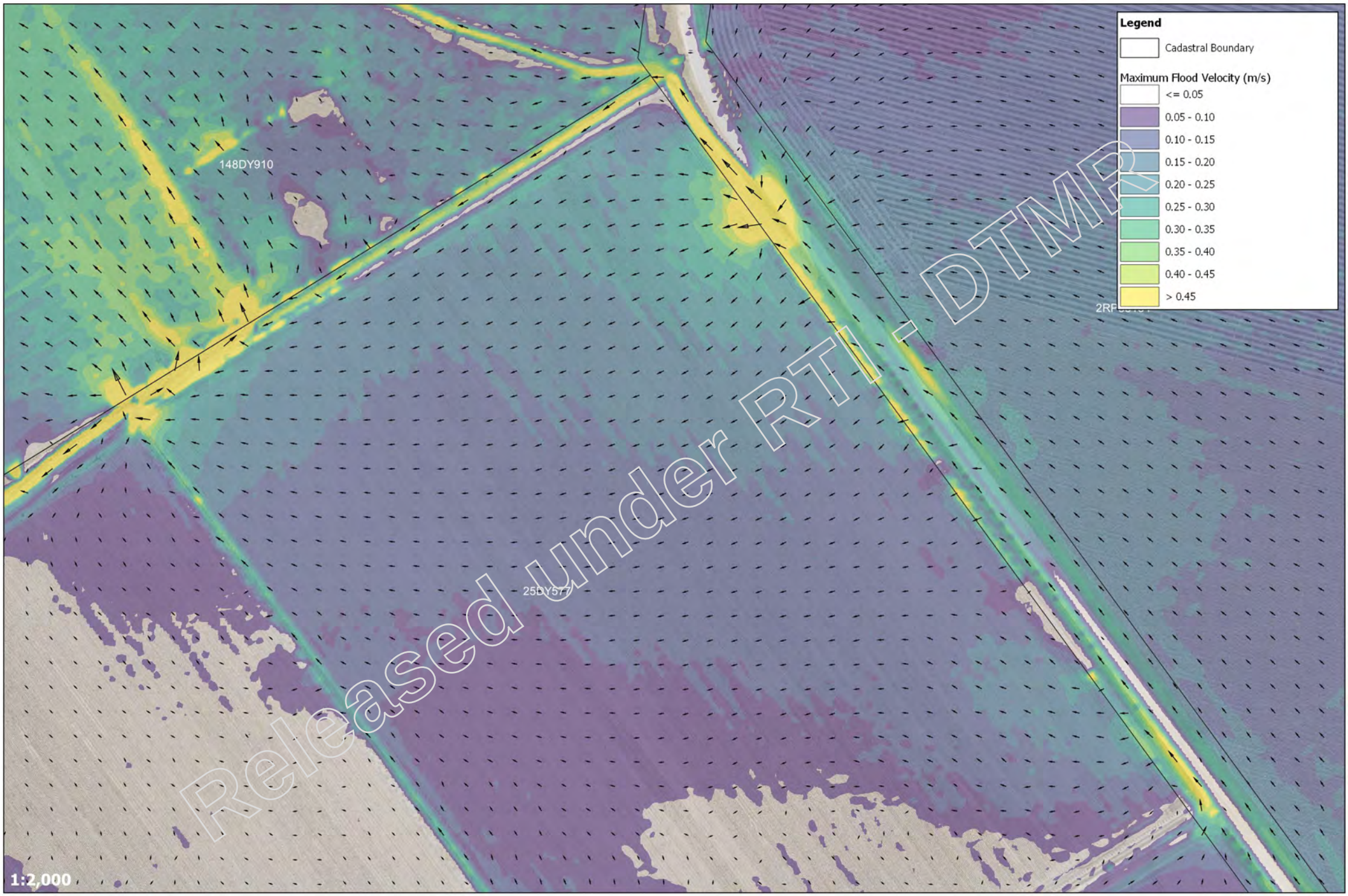
Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 01% AEP

WATER TECHNOLOGY

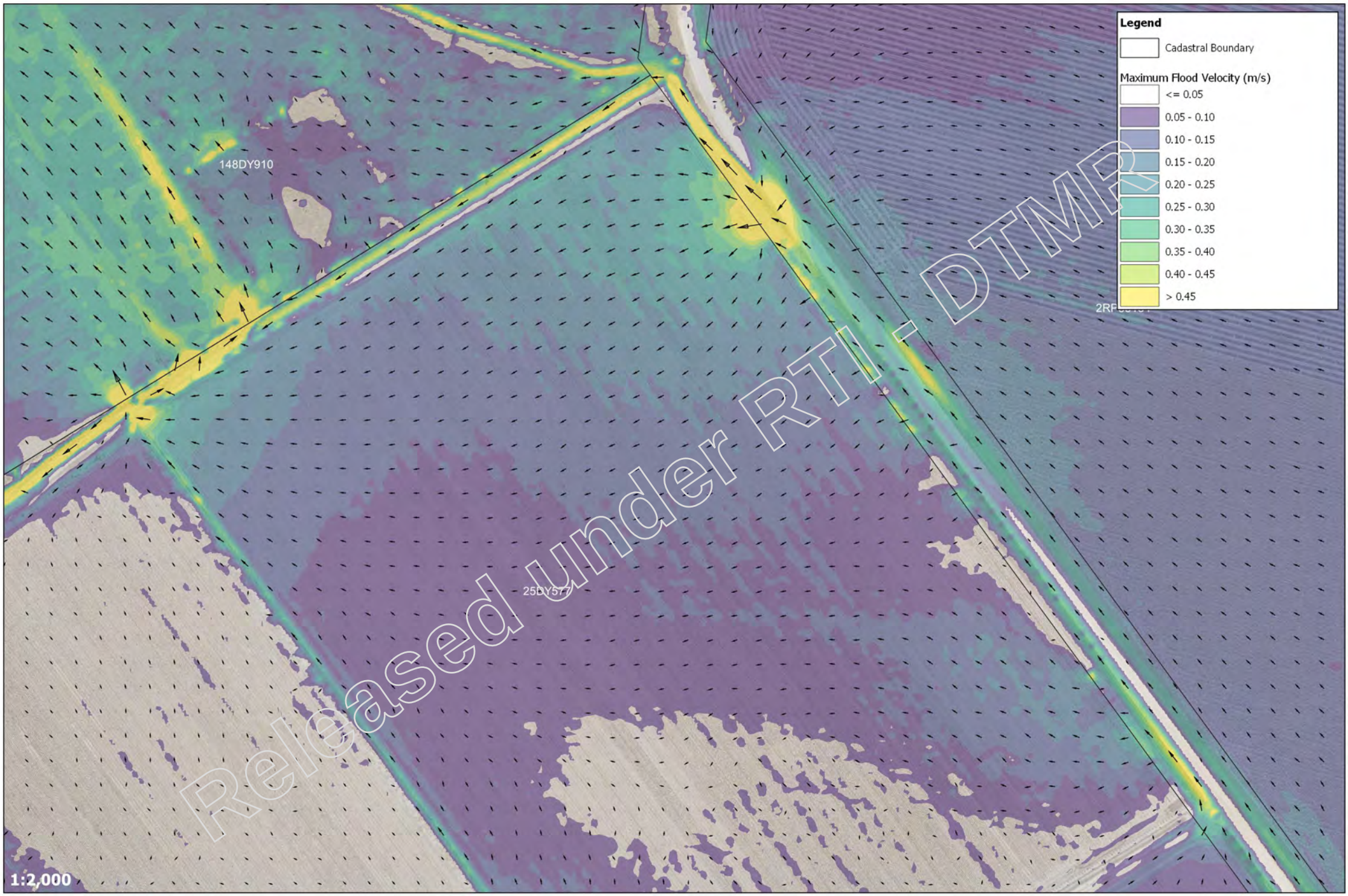


Imagery Source: Queensland Globe
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Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 02% AEP

WATER TECHNOLOGY

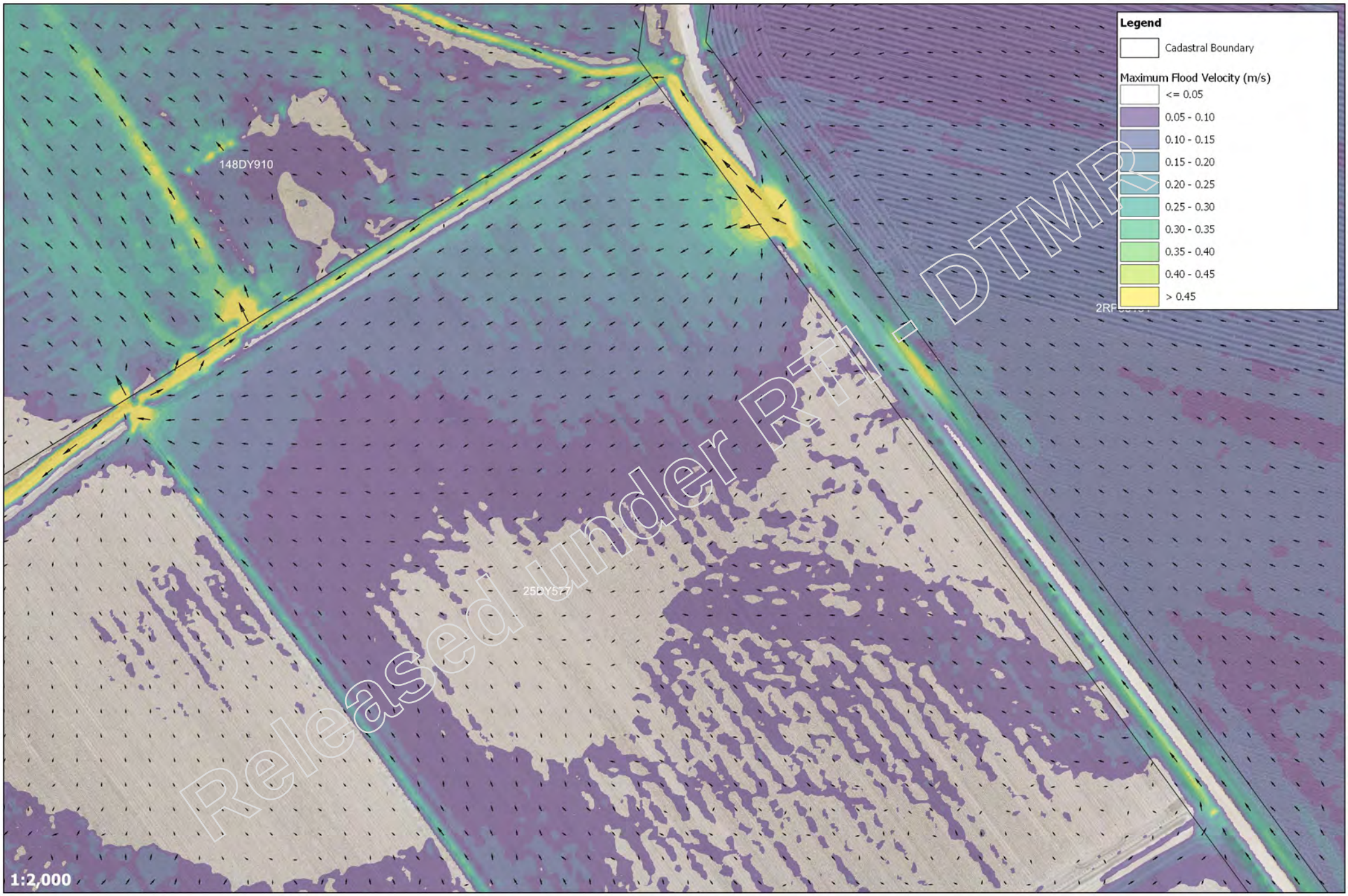


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 05% AEP

WATER TECHNOLOGY



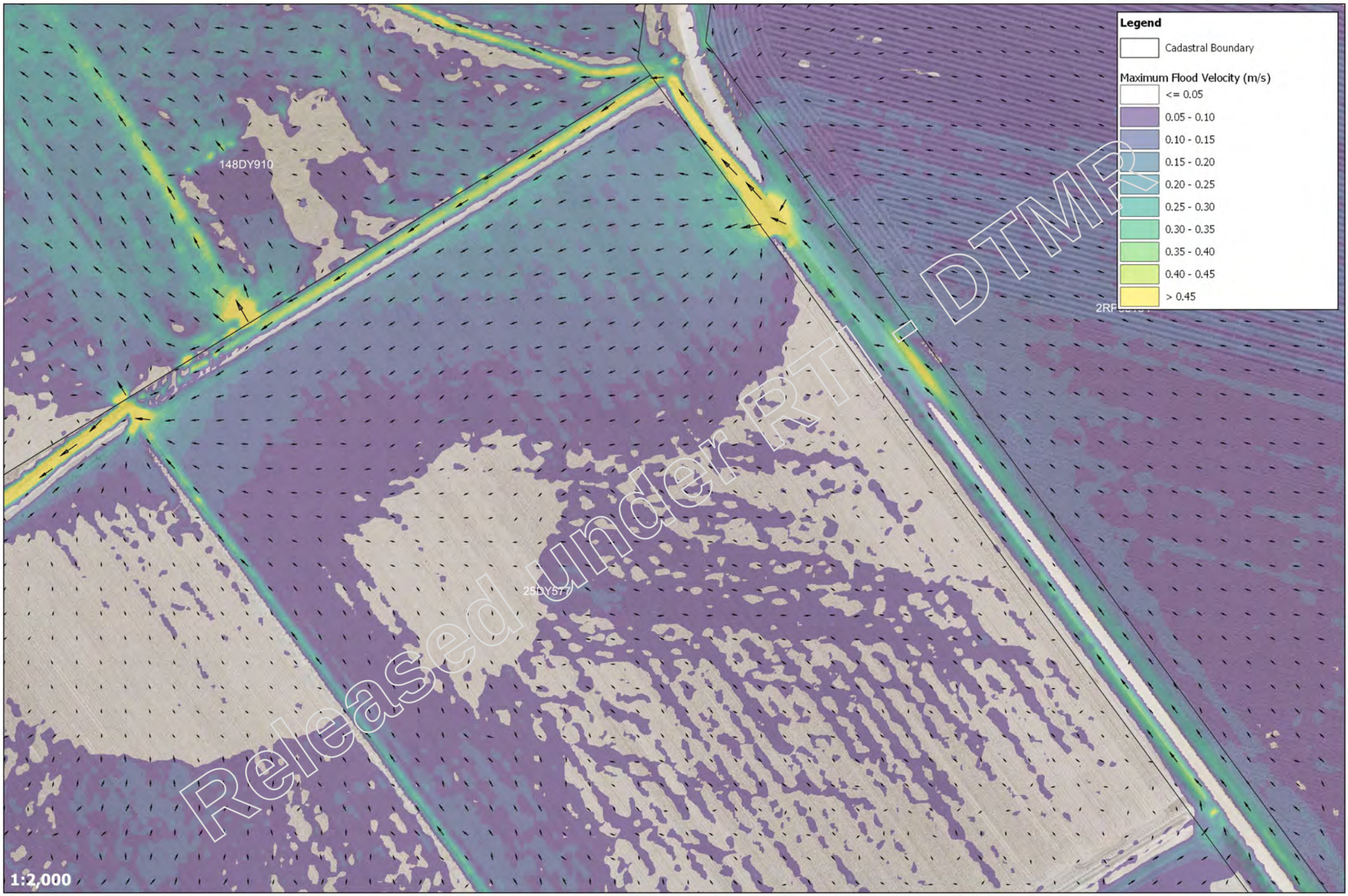
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Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 10% AEP

WATER TECHNOLOGY

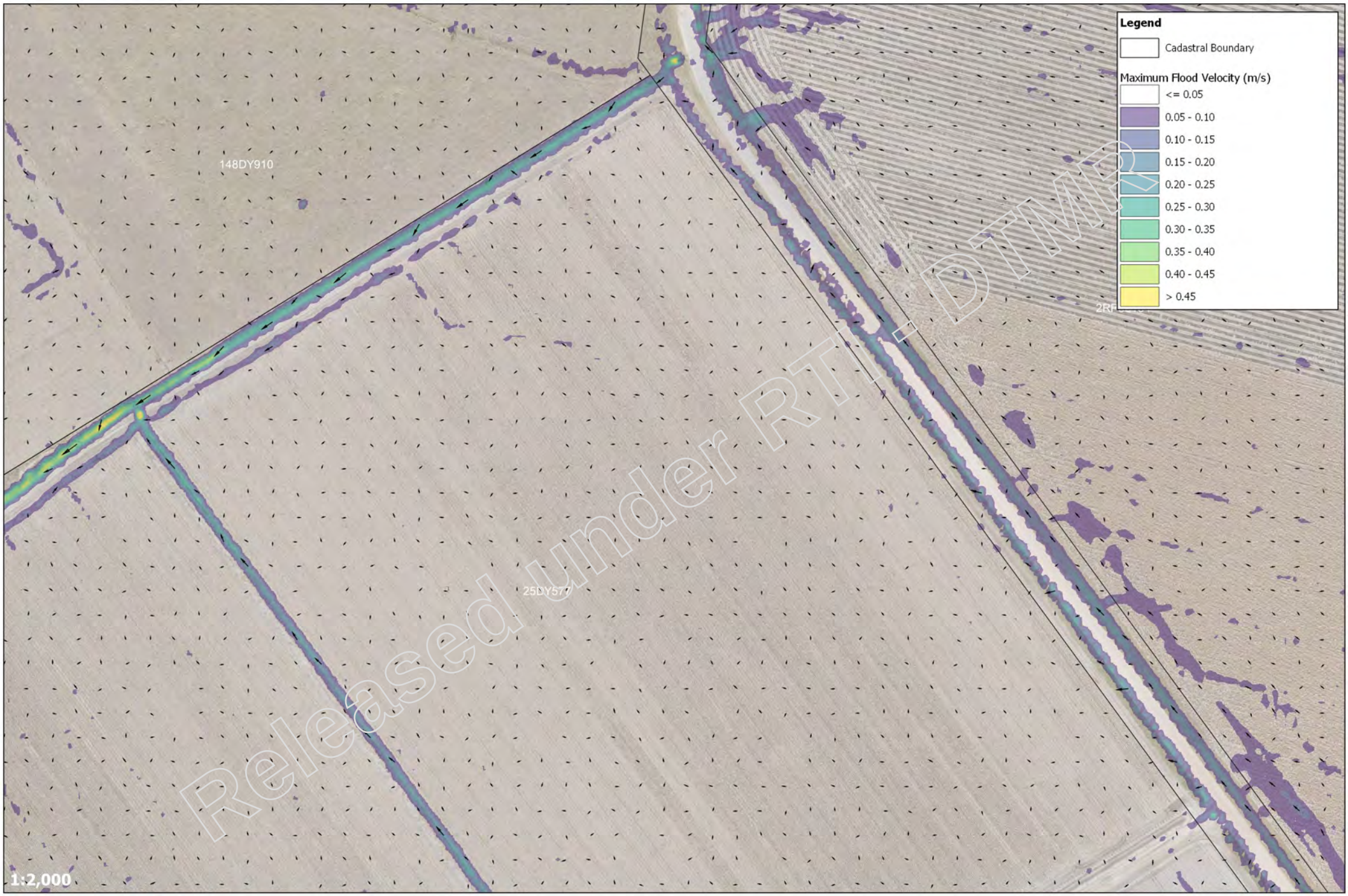


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 20% AEP

WATER TECHNOLOGY



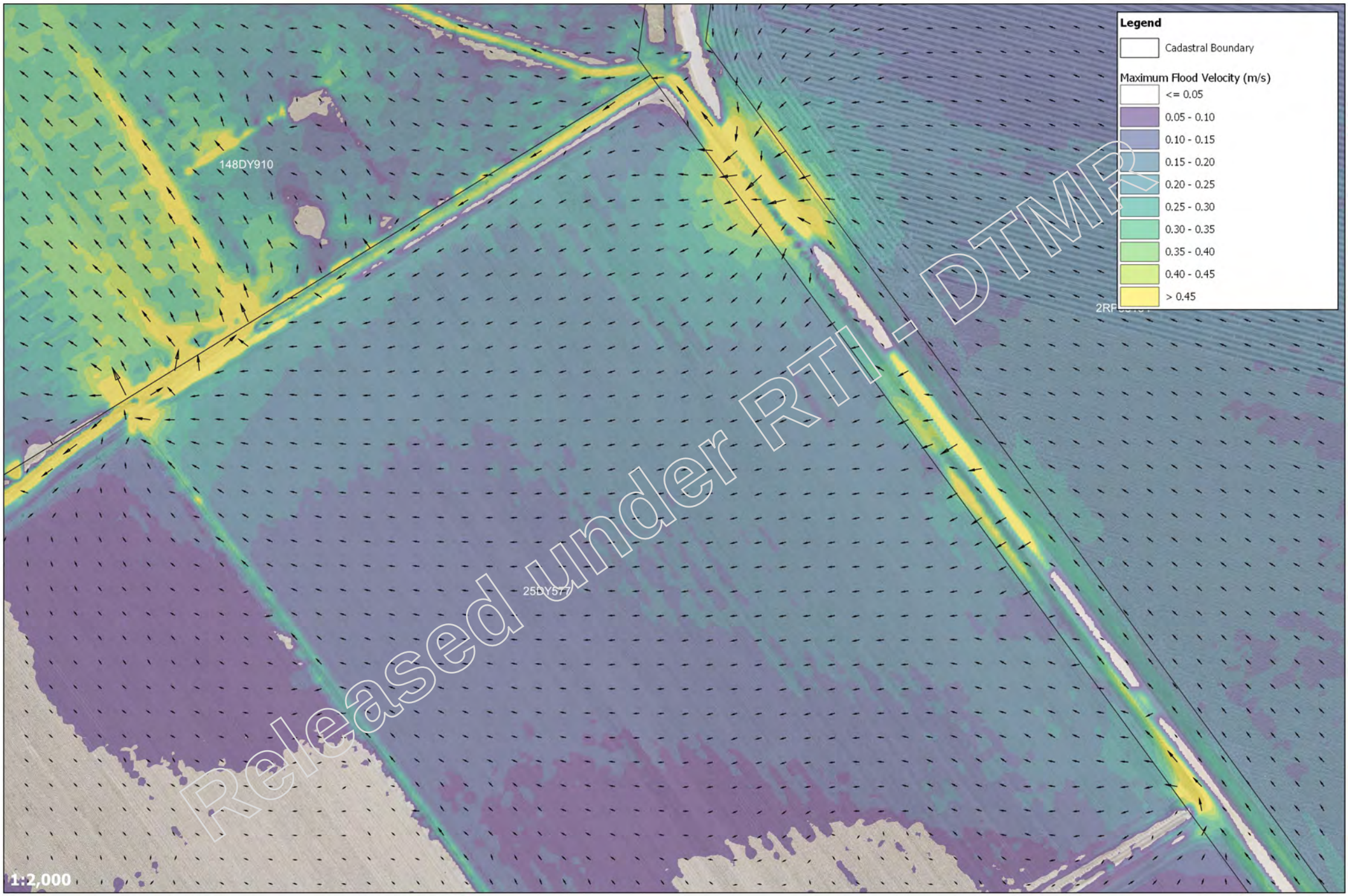
Released under RTI DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Post-Development TIN) (DEV10g1) - Flood Velocity - 50% AEP

WATER TECHNOLOGY

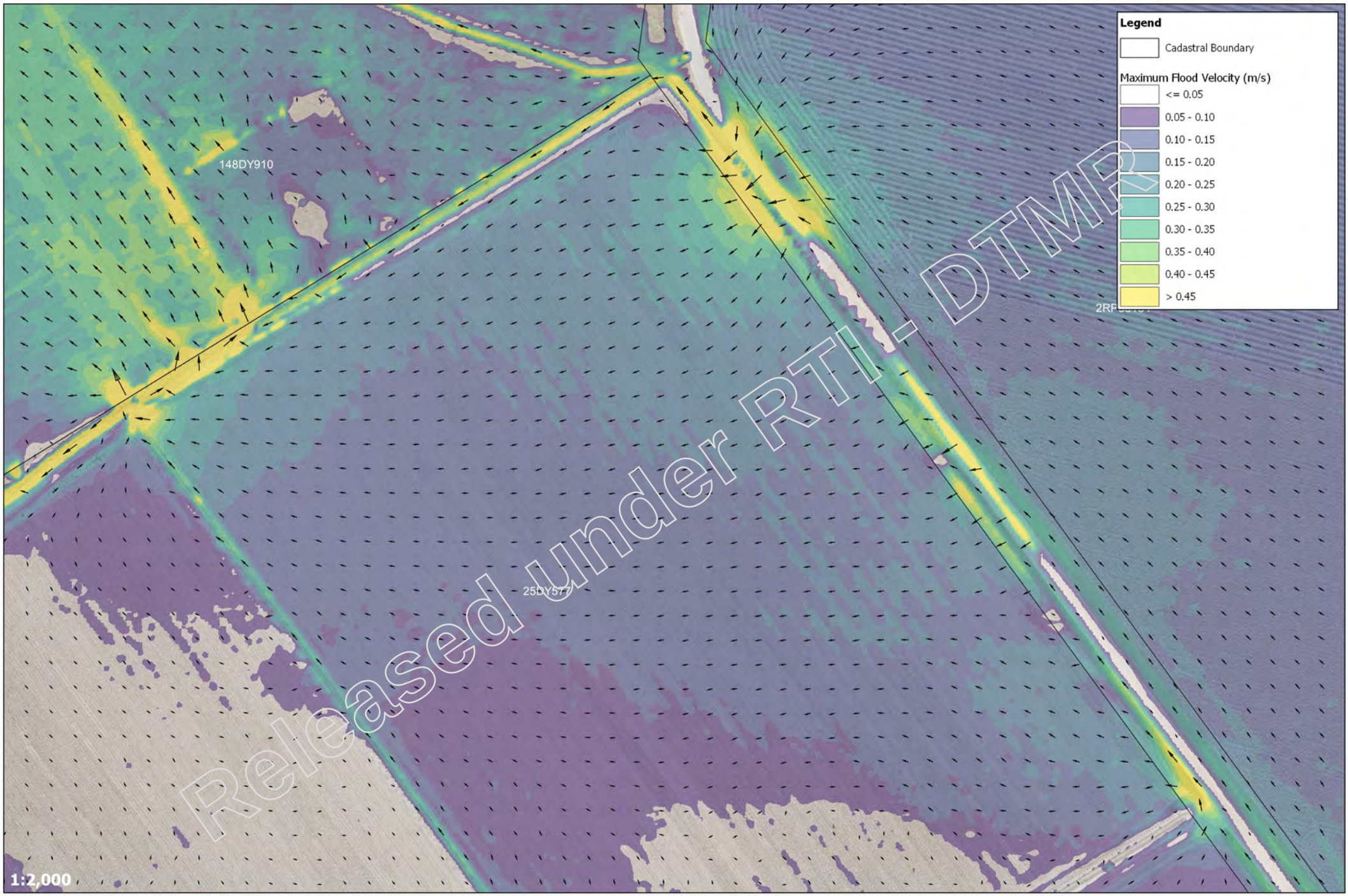


Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 01% AEP

WATER TECHNOLOGY



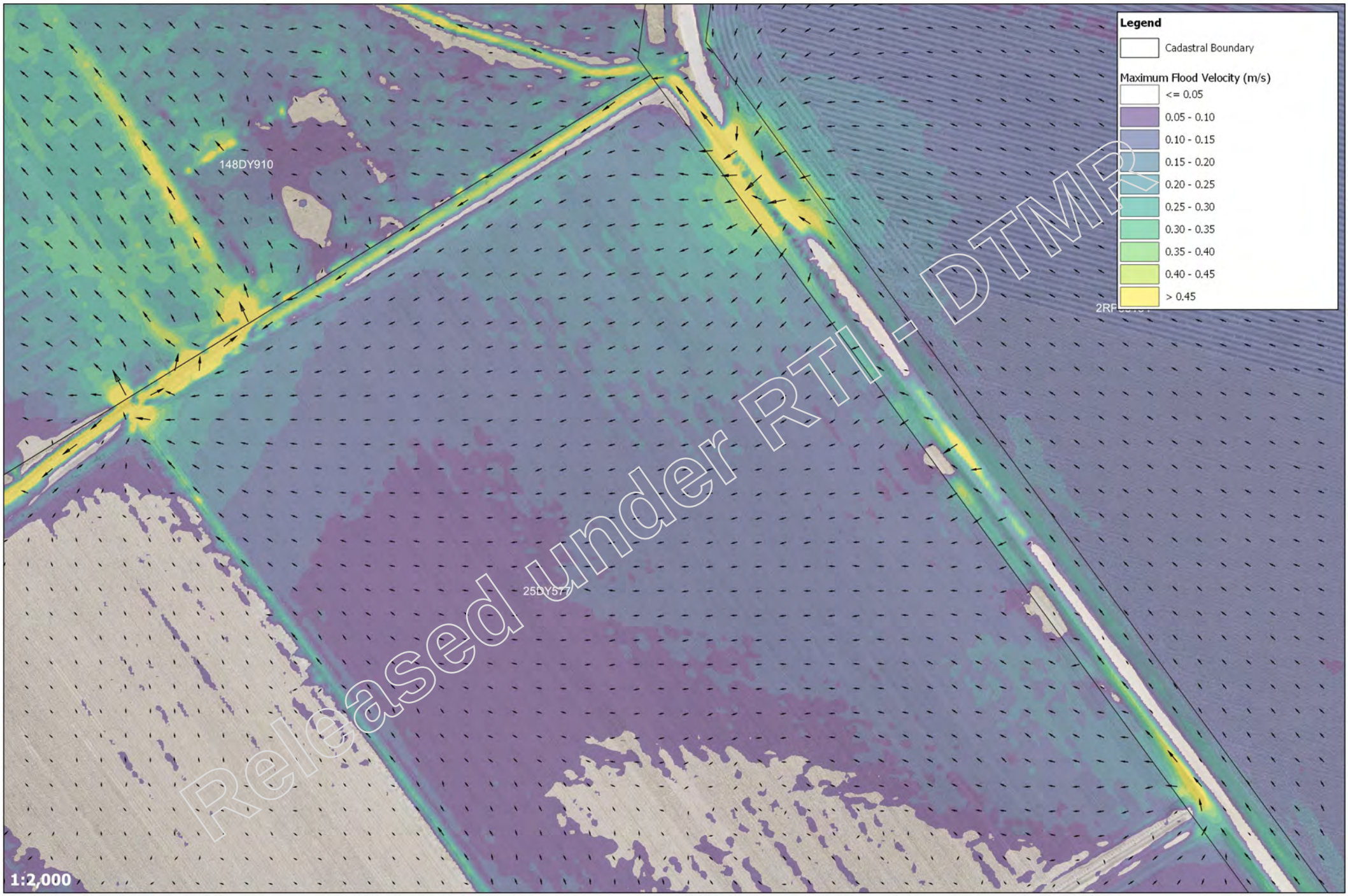
Released under RTI - DTMR

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Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity- 02% AEP

WATER TECHNOLOGY

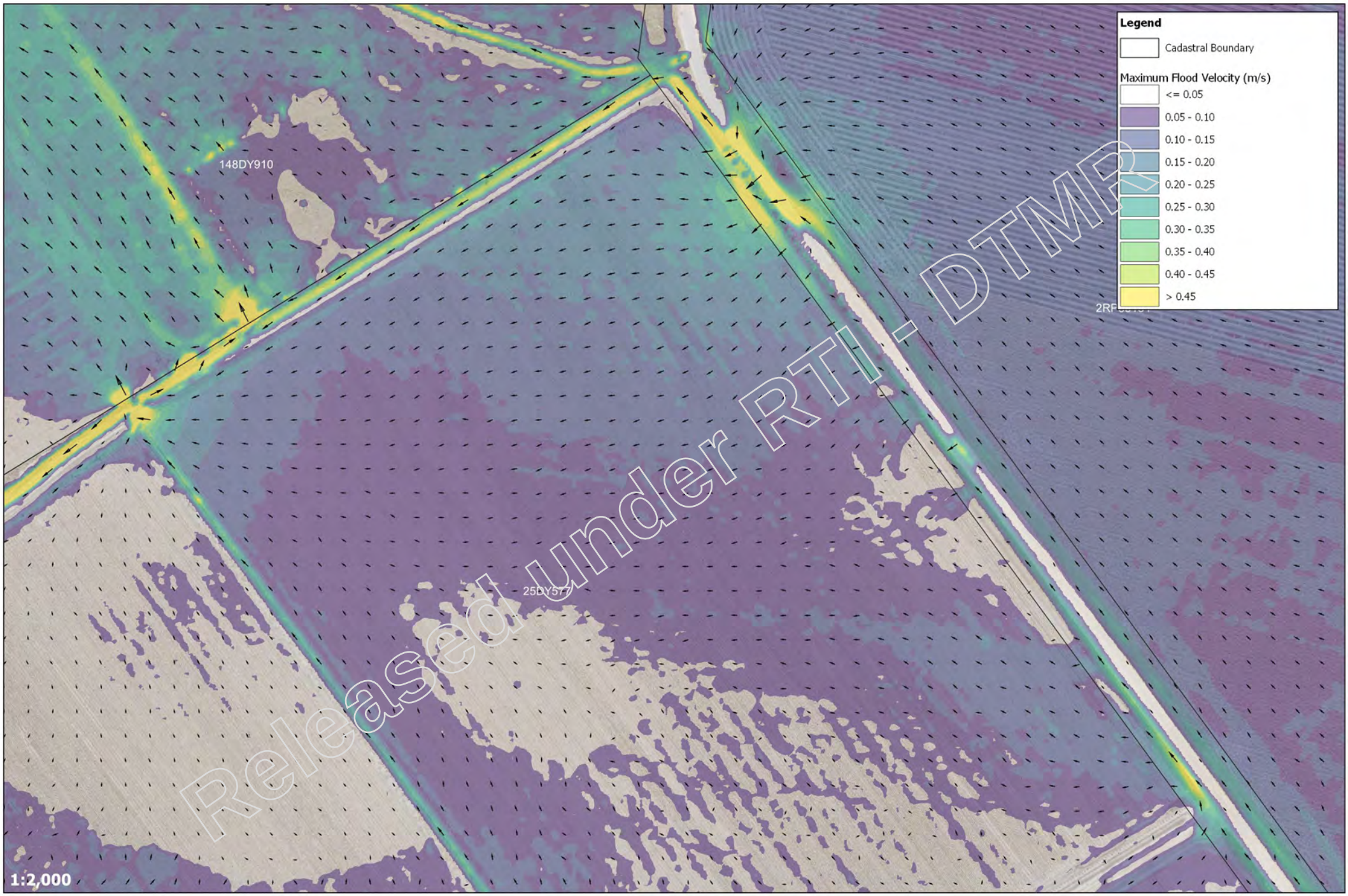


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Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 05% AEP

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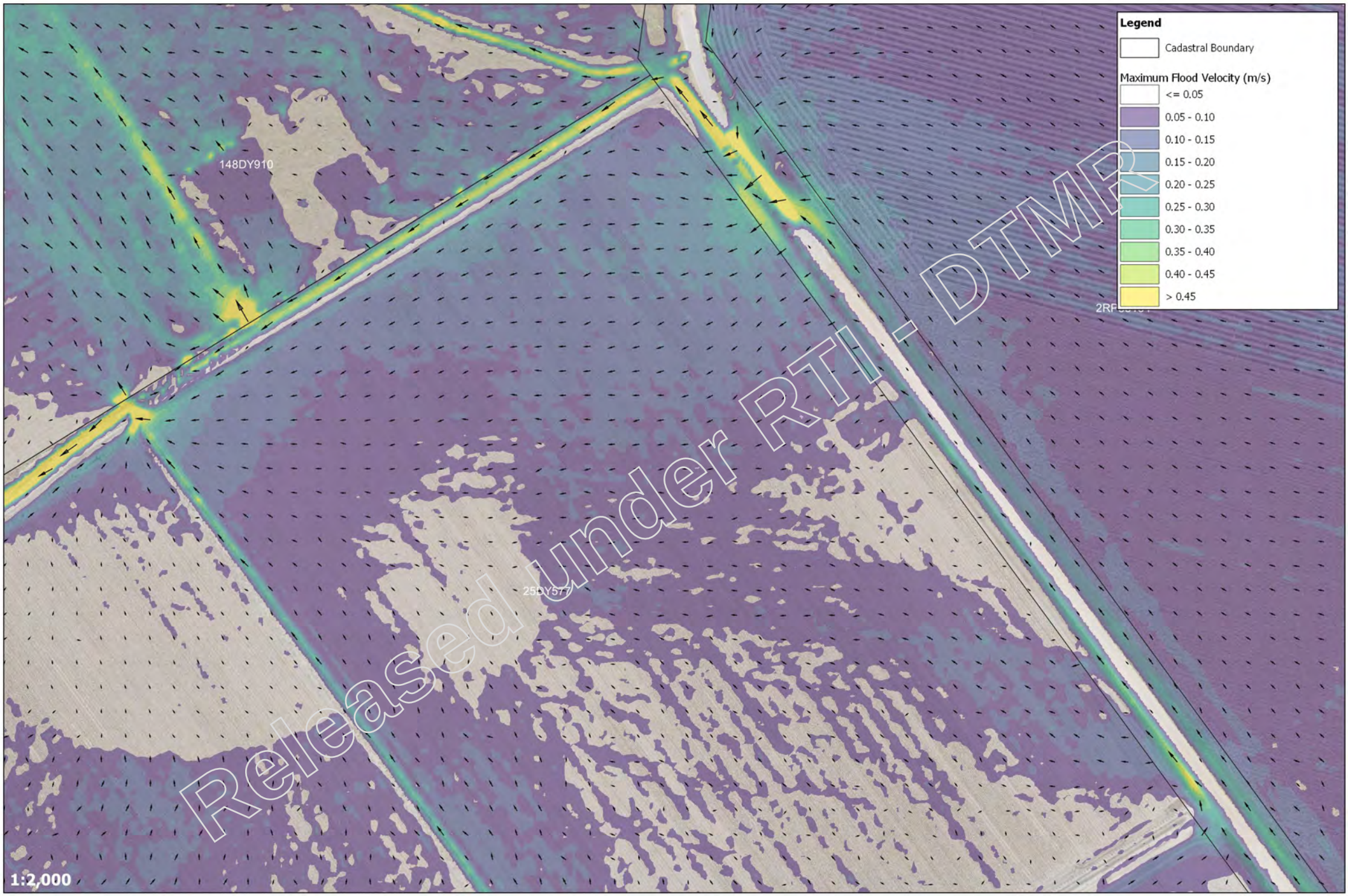
Released under RTI - DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 10% AEP

WATER TECHNOLOGY



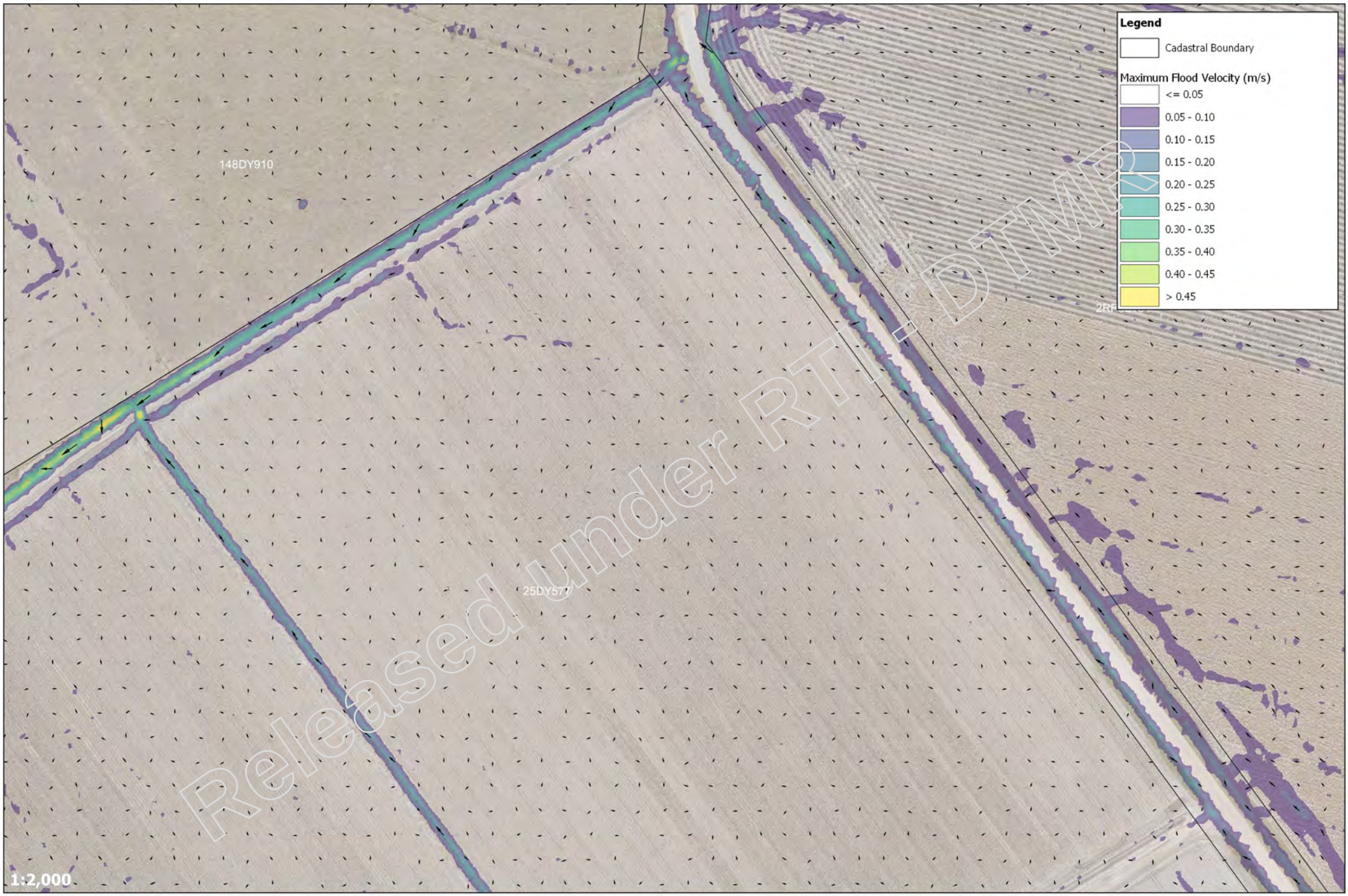
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Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 20% AEP

WATER TECHNOLOGY



Released under RTI DTMR

Imagery Source: Queensland Globe
Projection: GDA / MGA 94 Zone
Produced By: Water Technology Pty

0 50 100 m

Daandine-Nandi Road Upgrade - Arrow Energy
Velocity Vectors - LiDAR Dataset - 2020 (With Pre-Development TIN) (EXG02) - Flood Velocity - 50% AEP

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