

WARRUMBUNGLA SHIRE COUNCIL KENEBRI BORE ASSESSMENT REPORT 07/12/2022



*Every Bore is unique,
Your proactive preventative maintenance
program should be too!*



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Water Industry Operators Association of Australia

ACS Equip Pty Ltd

Warrumbungle Shire Council – Kenebri Bore

Assessment Report 07/12/2022



KENEBRI BORE

Report No: WARRSC07122022
Date: 07/12/2022
Revision: 01
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File Name: Warrumbungle Shire Council – Kenebri Bore Assessment Report 07/12/2022

Document history and revisions

Revision	Date	Description	Prepared By	Approved By
01	07/12/2022	WARRSC07122022	Luke Woods	Brad Dillon



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Preface

This report was initiated in response to the findings of the ACS Equip Pty Ltd – CCTV Inspection and Bore Condition Assessment service commissioned on the 7th of December 2022 by the Warrumbungle Shire Council.

ACS were engaged by the Orana Water Utilities Alliance on behalf of the Warrumbungle Shire Council to assess the condition of the Kenebri Bore as part of the bore condition assesment program.

Bore Details:

Bore ID:	Kenebri Bore
Ground Works Number:	GW007716
Bore Licence:	90CA833298
Date drilled:	01/03/1949
Field:	Not Applicable
Location:	Kenebri NSW
Coordinates:	Not supplied
Bore Type:	Town Water Supply
Casing Outside Diameter:	148mm
Casing Inside Diameter:	140mm
Casing Wall Thickness:	4.00mm
Casing Stickup:	0.00m
Casing Type:	Mild Steel
Screen:	Slotted Mild Steel
Apertures:	Not Supplied
Slotted From – To:	See report
Bore Depth:	34.50m encountered depth 47.20m constructed depth
Standing Water Level:	17.50m



Works Undertaken:

07/12/2022

- Establish onsite, site setup.
- Existing submersible pump, headworks and equipment removed from bore to allow the CCTV Downhole camera inspection and bore condition assessment to be completed.
- Submersible pump, headworks, and equipment reinstalled into Bore.
- Site pack up and clean up.

Initial CCTV inspection notes

- Bore headworks noted to be of poor design which would fail to meet the NSW health guidelines for groundwater. Bore headworks noted to be unsealed and open at ground level, which would be allowing biological contaminants to enter the bore.
- The Pump set depth was noted to be approximately 30m.
- Submersible pump and poly rising main were noted to have moderate growth levels present.
- Substantial pitting and corrosion noted through mild steel casing wall above standing water table, this indicates that the apparent metal loss has been severe and the casing wall will be extremely thin.
- Bore construction noted to consist of threaded mild steel casing.
- Standing water table at 17.50m.
- Slotted section noted to commence at 21.00m.
- Slotted section noted to have significant growth and encrustation present over the slotted apertures.
- Slotted apertures suffering from substantial growth resulting in a decreased draw area of the bore and increased suction velocities
- Slotted apertures noted to be significantly corroded and enlarged.
- Significant corrosion and holes noted through mild steel casing wall between 23.10m.



- Large hole noted through mild steel casing wall at 31.70m.
- Bottom depth encountered was 34.50m and the construction depth specified in the Groundworks report is 47.20m indicating that there is 12.70m of debris / fill present in the bottom of the bore.

Slotted Section:

Slotted Section A: 21.00m to 21.60m

Slotted Section B: 42.00m to 43.00m



Illustrations of Bore headworks and Submersible pump:

The following figures are intended to demonstrate the general condition encountered of the bore headworks.



Unsealed headworks as viewed from surface.



Condition of pumping equipment showing Iron Bacteria and rusted casing pieces.





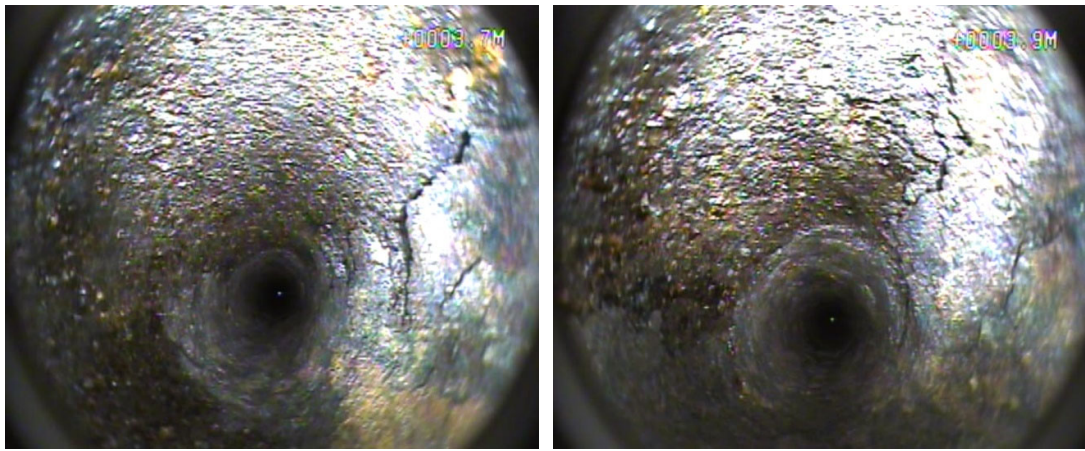
Identification plates as noted on submersible motor and wet end.



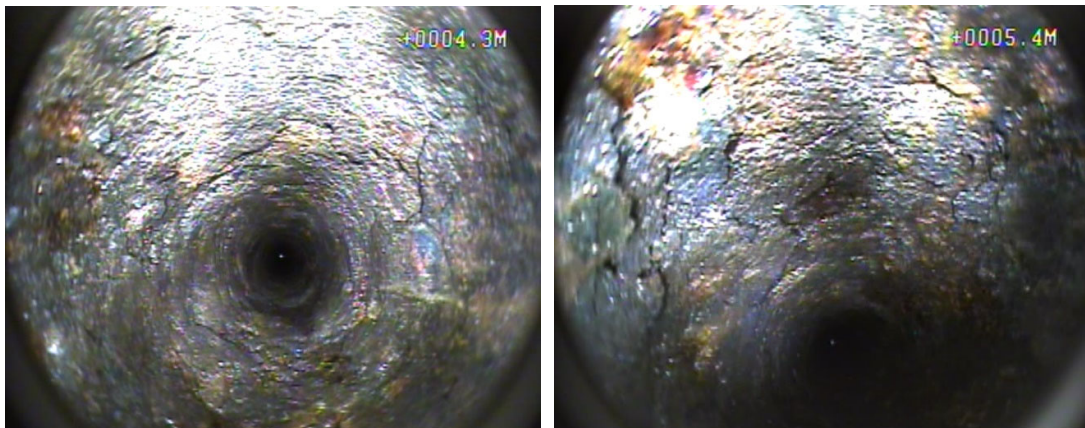
Illustrations of CCTV inspection:

The following figures are a quick reference guide intended to demonstrate the general condition of the bore.

A full copy of the inspection footage has been provided to the Warrumbungle Shire Council for further reference.

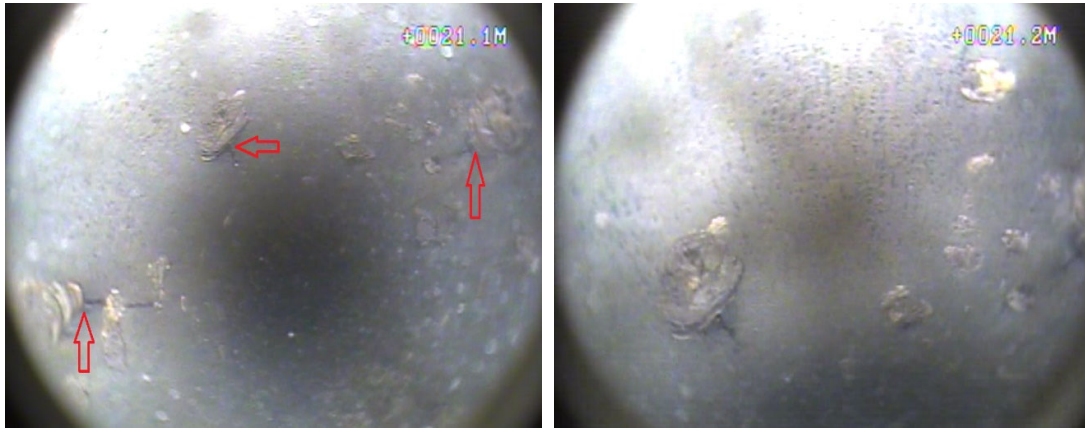


Bore at 3.70m and 3.90m showing condition of mild steel casing above the standing water level.

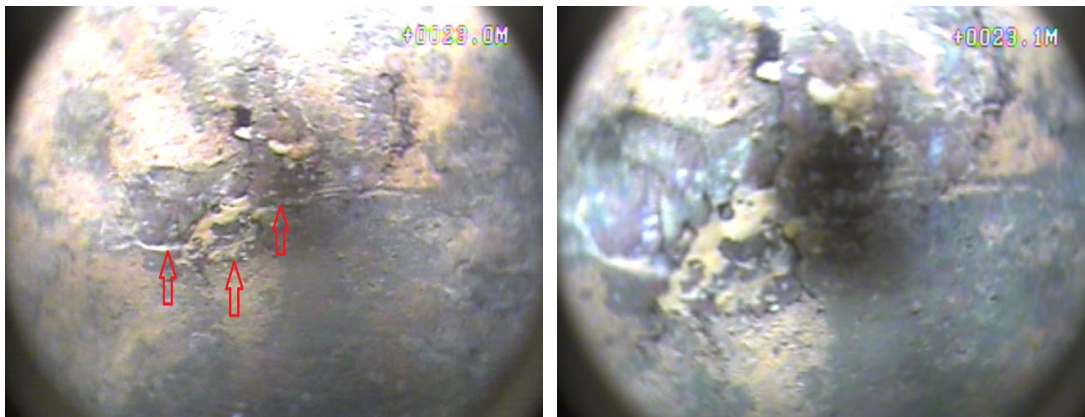


Bore at 4.30m and 5.40m showing condition of mild steel casing above the standing water level.

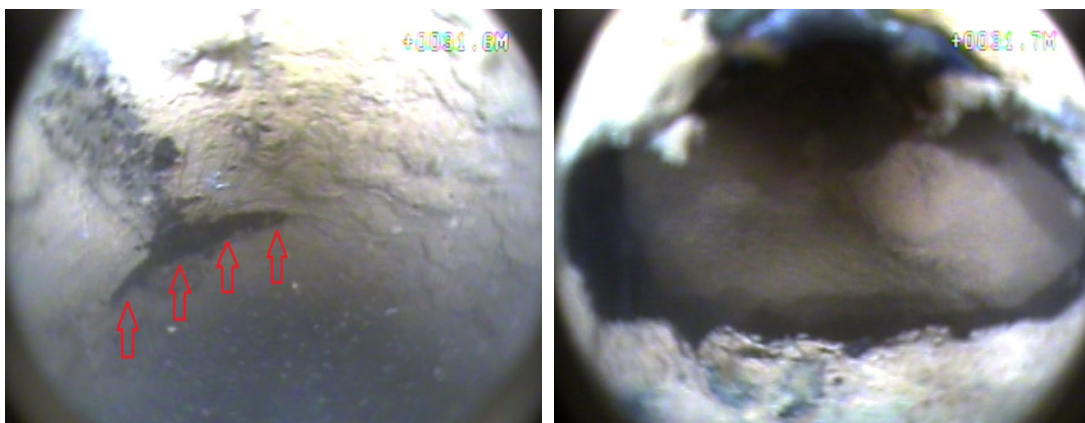




Slotted section at 21.10m and 21.20m.

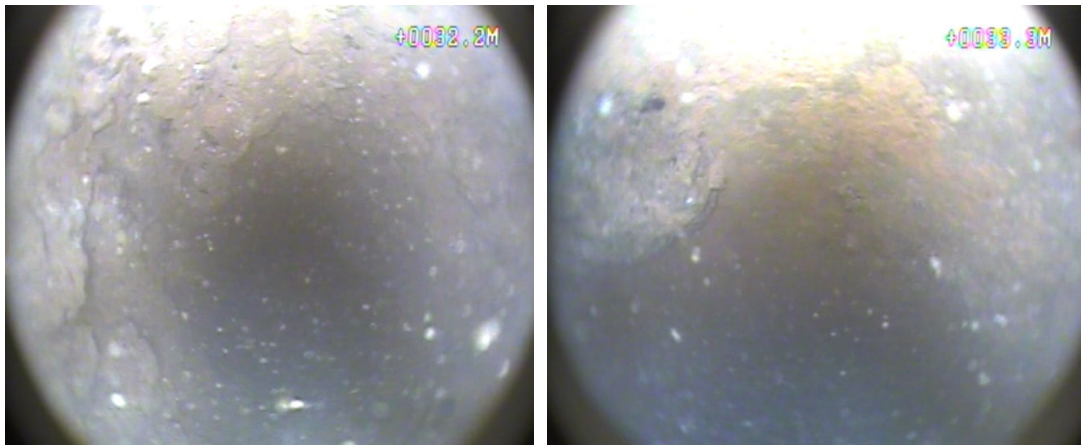


Corrosion / hole noted through mild steel casing wall at 23.10m.

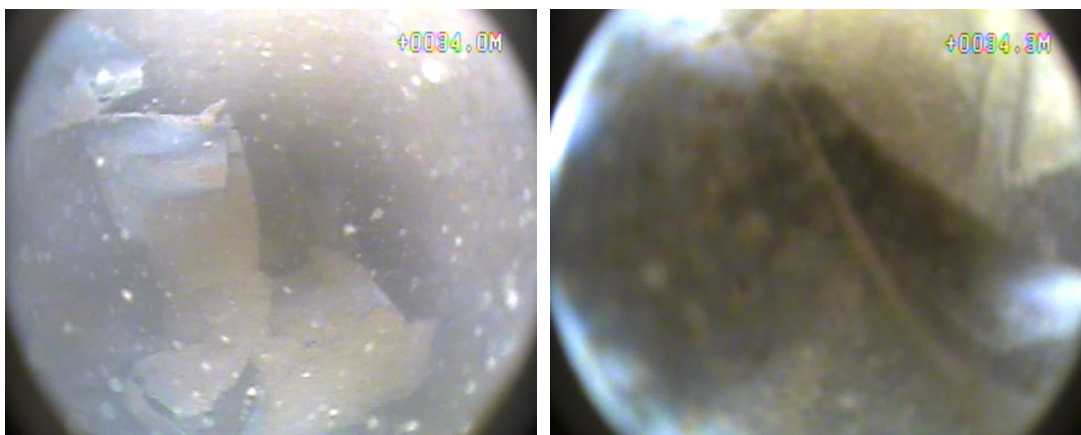


Large hole noted through mild steel casing wall at 31.70m.





Bore at 32.20m and 33.30m showing condition of mild steel casing and growth levels present.



Bottom of bore encountered at 34.40m.



Findings

During the camera inspection implemented on the 07/12/2022 the overall structural condition of the bore was noted to be extremely poor. Numerous areas of significant corrosion were noted through the mild steel casing wall including a catastrophic failure in the casing wall at 31.70m. This indicates that the mild steel casing has reached the end of its useful lifespan.

The encountered bottom depth was 34.50m and the construction depth specified in the groundworks report is 47.20m indicating that the bore has 12.70m of fill and debris present in the bottom.



Asset Condition Rating:

The asset condition rating established from the findings of the bore condition assessment undertaken on the 07/12/2022 is as follows;

5 – Very Poor

This rating has been allocated for the following reasons, Failure of the mild steel casing has occurred, and continued failure is imminent. The condition of the asset poses risk to safety, environment, or reputation beyond tolerable limits and the asset is in Urgent need for renewal of major components, replacement, or removal of asset from service.

Condition Rating Table: IIMM condition rating system of 1 – 5.

Grade	Condition	Description
1	Excellent	New or as new condition. Only normal cyclic maintenance required. Negligible wear and/or undamaged or damaged repaired to original condition.
2	Very Good	Sound condition with some wear and tear. Minor maintenance required along with normal cyclic maintenance. Minor components may need replacement. Low risk to safety, environment, or reputation due to asset condition.
3	Good	Significant deterioration evident. Maintenance other than normal cyclic maintenance required on a regular basis to sustain asset. Minor failures may be occurring. Condition is impacting performance of the asset. Risk to safety, environment, or reputation due to asset condition within tolerable limits but requires high level of maintenance.
4	Poor	Failure likely in short term. Asset not performing required function or not performing function without significant additional maintenance activity on top of normal cyclic maintenance. Risk to safety, environment, or reputation due to asset condition approaching tolerable limits. Significant renewal or replacement required.
5	Very Poor	Failure occurred or failure imminent. Risk to safety, environment, or reputation due to asset condition beyond tolerable limits. Urgent need for renewal of major components, replacement, or removal of asset.

Asset Condition Rating system



Recommendations:

In the bores current condition further use is not advisable (**continued use can result in catastrophic bore failure**) due to the structural failings identified in the mild steel casing wall;

It is likely that the mild steel casing will continue to develop failures, these failures can result in;

- gravel / sand intrusion into the bore or more likely, catastrophic bore failure which has the potential to result in complete loss of bore asset: bore, submersible pump etc.

The following recommendations are made to maintain a reliable potable town water supply from the Kenebri Bore that will meet the NSW health guidelines for groundwater.

- Removal of the bore pump to allow the corrective works to be undertaken.
- Removal of the fill noted in the bottom of the bore and reopening the bore back to its original constructed depth via bailing operations.
- Stainless steel swage relining operations to be undertaken over the full depth of the bore with stainless steel screens installed over the slotted mild steel section and stainless-steel casing over the mild steel section. This will effectively create a full stainless steel bore design.
- Redeveloping and reconditioning the water bearing zone via the ACS Equip redevelopment operations consisting of an Aquaclear Bore Cleaner dosage to be injected over the entire length of the bore followed by high pressure redevelopment operations for gravel pack development.
- Manufacture and installation of a shroud over the submersible pump to redirect the intake vertically and decrease the suction velocities. This will also force the pump to draw water over the motor during operation which will assist in cooling and prolong the operational life of the pump.
- Corrective works undertaken on the headworks to meet the NSW health guidelines for ground water. This will need to include IP68 rated electrical glands and redesign of the bore cap to allow a weatherproof seal to the top of the bore casing.
- Disinfection and cleaning of the bore pump prior to reinstallation.



Appendices:

Appendix A: Groundworks report

WaterNSW Work Summary

GW007716

Licence: 90CA833298

Licence Status: CURRENT

Authorised Purpose(s): TOWN WATER SUPPLY
Intended Purpose(s): PUBLIC/MUNICIPAL

Work Type: Bore

Work Status:

Construct.Method: Cable Tool

Owner Type: Local Govt

Commenced Date:
Completion Date: 01/03/1949

Final Depth: 47.20 m
Drilled Depth: 47.20 m

Contractor Name: (None)

Driller:

Assistant Driller:

Property: N/A WARRUMBUNGL SHIRE
COUNCIL P O BOX 191
COONABARABRAN 2357 NSW
GWMA: 023 - MISCELLANEOUS ALLUVIUM
OF THE BARWON REGION
GW Zone: 013 -

Standing Water Level
(m):

Salinity Description: Fresh

Yield (L/s):

Site Details

Site Chosen By:

County
Form A: BARADINE
Licensed: BARADINE

Parish
MILLER
MILLER

Cadastre
L16 (16)
Whole Lot 16//750294

Region: 90 - Barwon
River Basin: 419 - NAMOI RIVER
Area/District:

CMA Map: 8736-S
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6592988.000
Easting: 693571.000

Latitude: 30°46'49.4"S
Longitude: 149°01'22.2"E

GS Map: -

MGA Zone: 55

Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel
Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	-0.50	43.40	152			Suspended in Clamps

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
21.30	21.60	0.30	Unconsolidated	21.30		0.03			
42.60	43.50	0.90	Unconsolidated	25.90		1.20			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.52	1.52	Loam Sandy	Loam	
1.52	21.33	19.81	Clay Yellow Sandy	Clay	
21.33	21.64	0.31	Sand Fine Water Supply	Sand	
21.64	42.67	21.03	Clay Yellow Sandy	Clay	



42.67	43.58	0.91	Clay Sandy Nodular Water Supply	Clay	
43.58	47.24	3.66	Sand Yellow Clay	Sand	

Remarks

24/11/1981: KENEBRI WATER SUPPLY

*** End of GW007716 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.



Appendix B: Bore Location

