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WARRUMBUNGLE SHIRE COUNCIL BARADINE MAIN BORE ASSESSMENT REPORT 15/12/2022

Every Bore is unique,

Your proactive preventative maintenance program should be too!

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ACS Equip Pty Ltd

Warrumbungle Shire Council – Baradine Main Bore Assessment Report 15/12/2022

BARADINE MAIN BORE

Report No: WARRSC15122022

Date: 15/12/2022

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Author: Luke Woods

Project Manager: Luke Woods

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Document history and revisions

Revision	Date	Description	Prepared By	Approved By
01	15/12/2022	WARRSC15122022	Luke Woods	Brad Dillon

Contents

Preface

This report was initiated in response to the findings of the ACS Equip Pty Ltd – CCTV Inspection and Bore Condition Assessment service commisioned on the 15th 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 Baradine Main Bore as part of the bore condition assesment program.

Bore Details:

Bore ID:	Baradine Main Bore
Ground Works Number:	GW273121
Bore Licence:	Not Supplied
Date drilled:	19/09/2009
Field:	Water Treatment Plant
Location:	Baradine NSW
Bore Type:	Town Water Supply
Casing Outside Diameter:	221mm from 0.00m to 93.50m
	168mm from 93.50m to 206.60m
Casing Inside Diameter:	206mm from 0.00m to 93.50m
	158mm from 93.50m to 206.60m
Casing Wall Thickness:	7.50mm
Casing Stickup:	0.00m
Casing Type:	Mild Steel
Screen:	Slotted Mild Steel
Apertures:	4.00mm
Slotted From – To:	See report
Bore Depth:	215.00m encountered depth
	216.00m constructed depth
Standing Water Level:	31.30m

Works Undertaken:

15/12/2022

- 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.
- CCTV Downhole camera inspection and bore condition assessment completed.
- Submersible pump, headworks, and equipment reinstalled into Bore.
- Site pack up and clean up.

Initital 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.
- Rising main noted to be suspended at the top of the bore casing with a mild steel clamp, the clamp was noted to be resting on the top of the casing with no form sealing and a large gap present.
- Rising main construction noted to be 115mm stainless steel column in various lengths ranging from 0.5m to 5.0m with threaded couplings. Column noted to have been welded at each coupling across its full depth.
- The Pump set depth was noted to be approximately 60m.
- Bore construction noted to consist of welded mild steel casing.
- Standing water table at 31.30m.
- Large particles noted to be suspended in the water column and the water column was noted to have high turbidity levels present, visibility was noted to be very poor.
- Significant levels of iron related bacteria growth noted to be present on the mild steel casing wall.
- Numerous areas of corrosion noted.
- J-Lacth step noted at 181.30m, bore construction noted to step down at this depth from 206.00mm inside diameter to 158.00mm inside diameter.

- Foreign object noted in bore at 187.00m, object appears to be small diameter pipe. Object noted to continue to the bottom of the bore.
- Large holes noted through mild steel casing wall at 187.90m
- Large holes noted through mild steel casing wall at 188.00m.
- Slotted section noted to commence at 190.70m.
- Significant corrosion and holes noted on mild steel weld join at 208.30m.
- Bottom depth encountered was 215.00m and the construction depth specified in the Groundworks report is 216.00m indicating that there is 1.00m of debris / fill present in the bottom of the bore.

Slotted Section:

Slotted Section A: 190.70m to 192.00m

Slotted Section B: 199.60m to 215.00m

Illustrations of Bore headworks and Submersible pump:

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

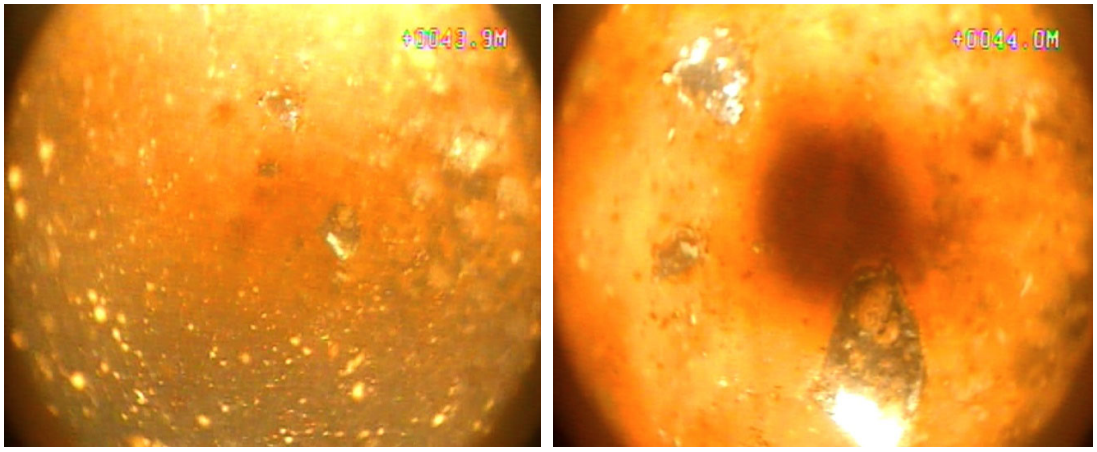
Condition of pumping equipment.

Identification plates as noted on submersible pump.

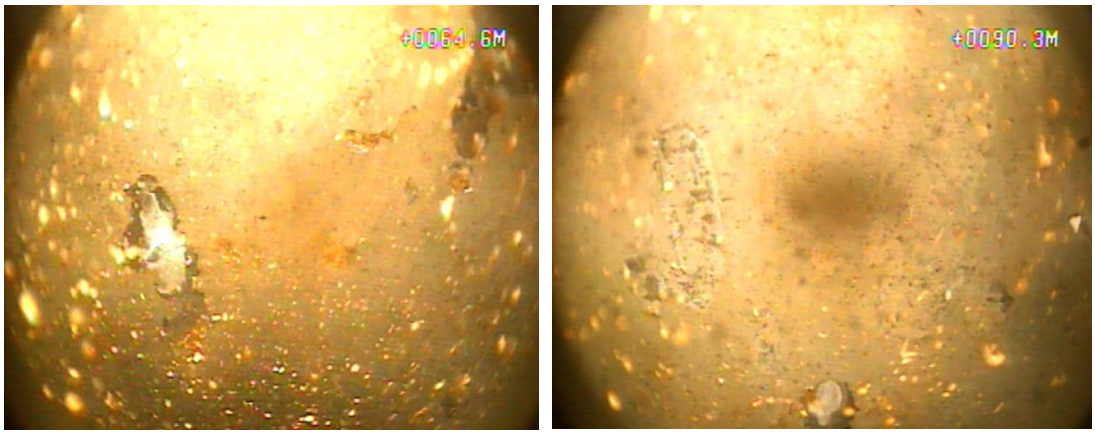
Illustrations of CCTV inspection:

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

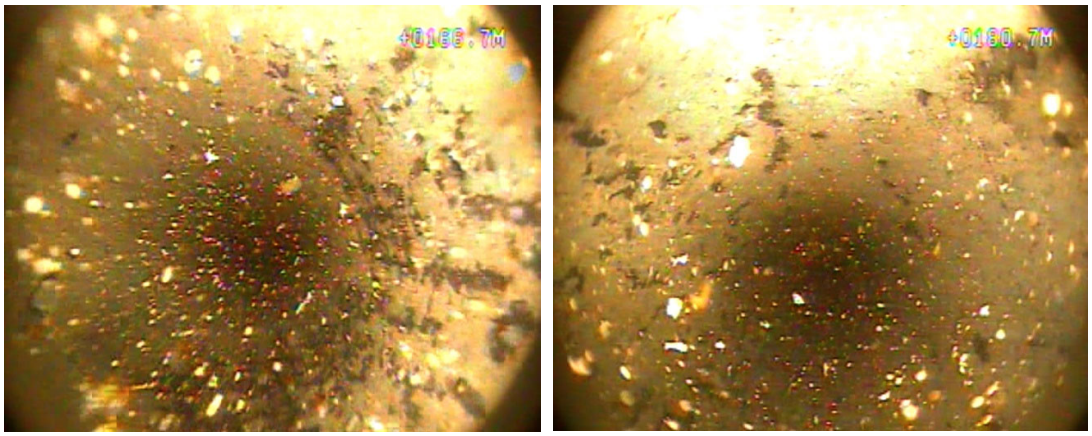
A full copy of the inspection footage has been provided to the Warrumbungle Shire Council for further reference.



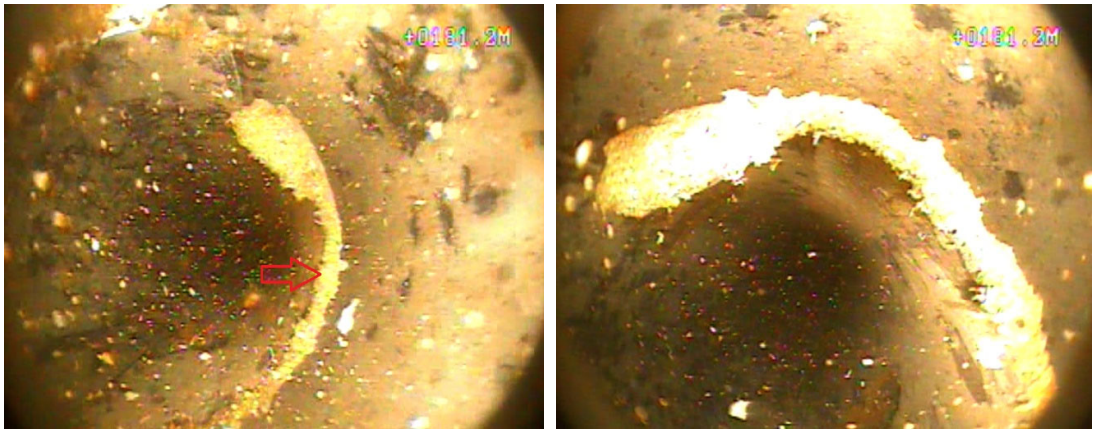
Bore at 43.90m and 44.00m showing iron related bacteria growth.



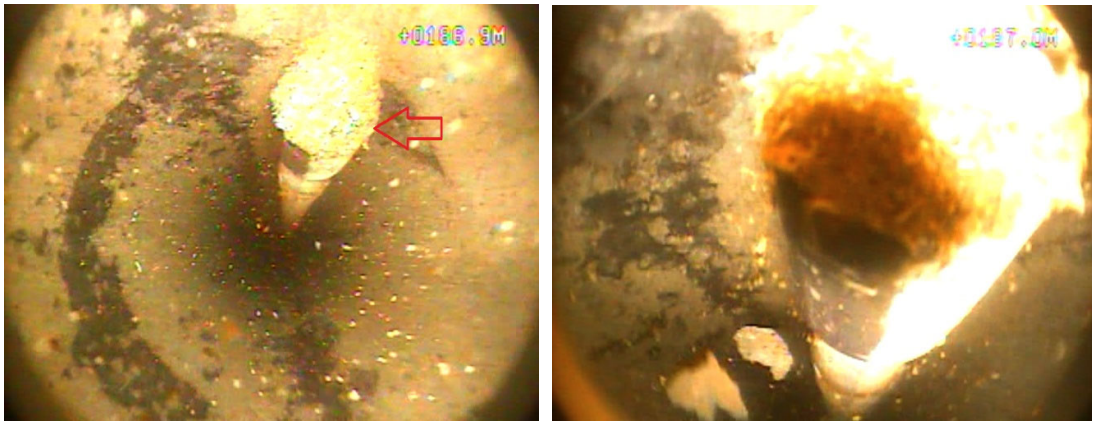
Bore at 64.60m and 90.30m showing the condition of the mild steel casing.



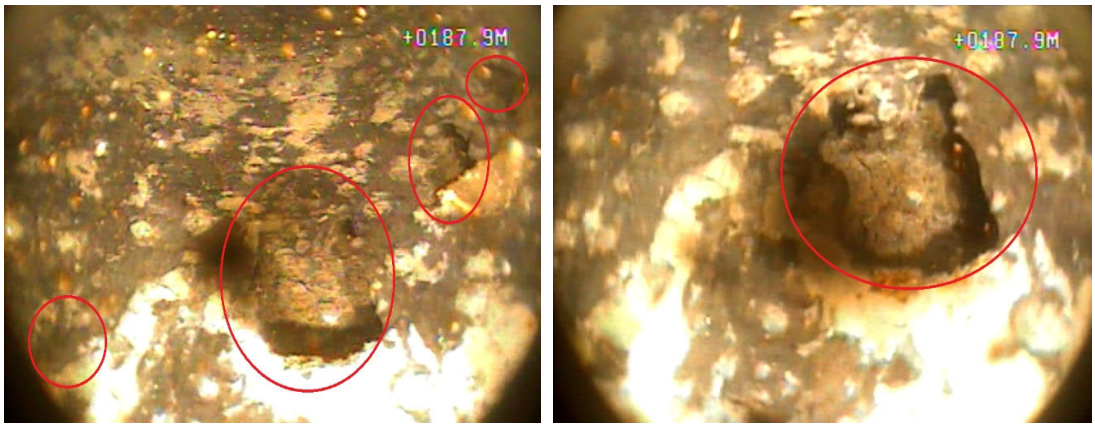
Bore at 166.70m and 180.70m showing the condition of the mild steel casing and corrosion occurring.



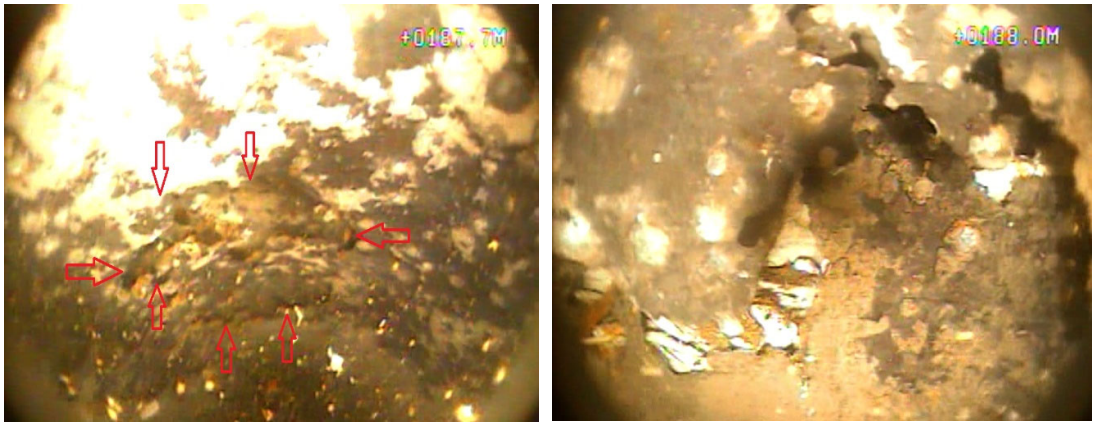
J Latch step noted at 181.30m.



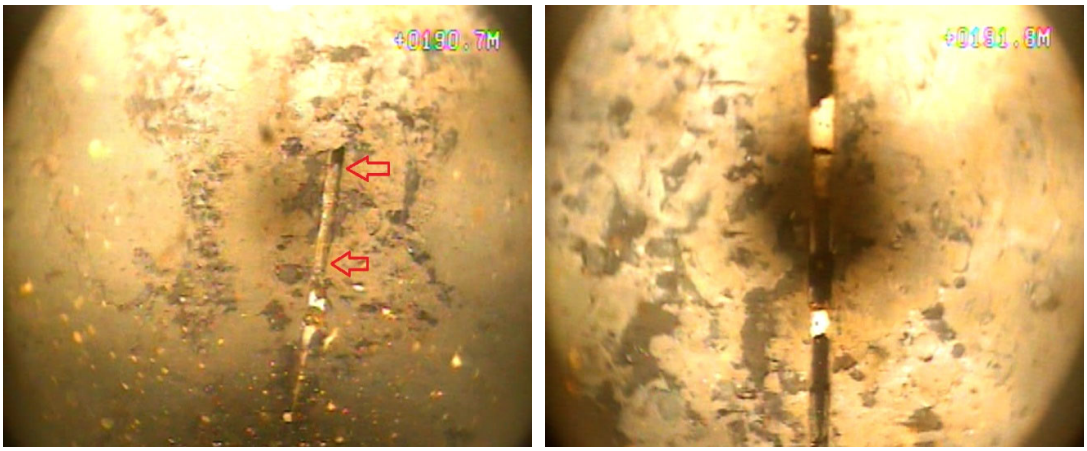
Foreign object noted in bore at 187.00m, object appears to be small diameter PVC pipe.



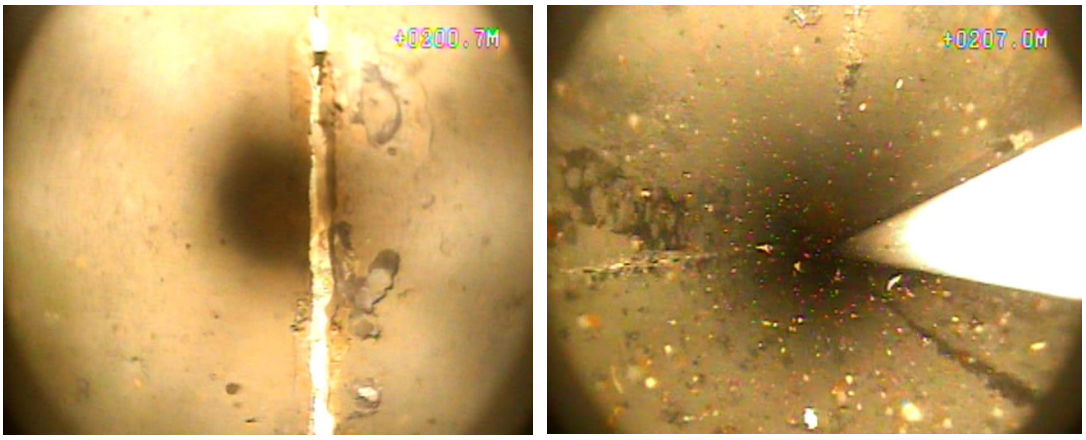
Large hole noted through mild steel casing wall at 187.90m.



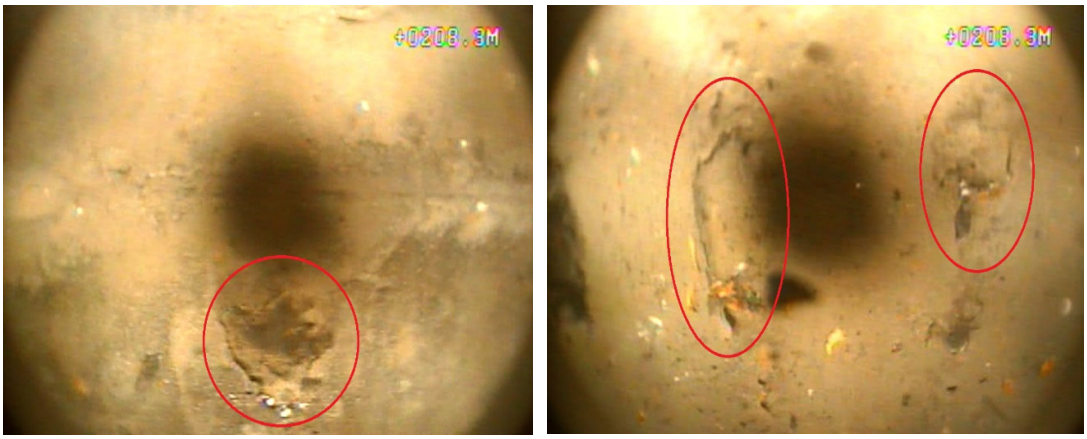
Large hole noted through mild steel casing wall at 188.00m.



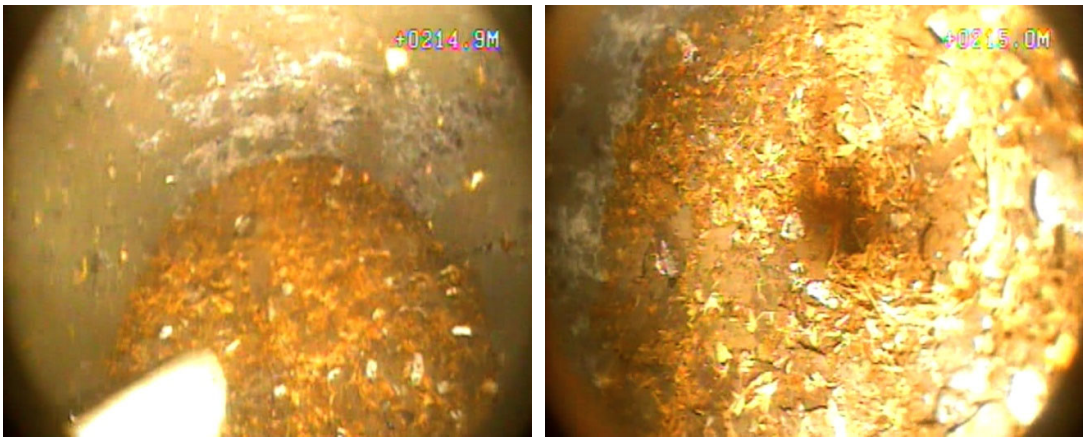
Slotted section at 190.70m and 191.80m.



Slotted section at 200.70m and 207.00m.



Corrosion and holes noted through mild steel weld join at 208.30m.



Bottom of bore encountered at 215.00m.

Findings

During the camera inspection implemented on the 15/12/2022 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. This indicates that the mild steel casing has reached the end of its useful lifespan.

The encountered bottom depth was 215.00m and the construction depth specified in the groundworks report is 216.00m indicating that the bore has 1.00m 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 15/12/2022 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 Baradine Main Bore that will meet the NSW health guidelines for groundwater.

- Removal of the bore pump to allow the corrective works to be undertaken.
- Retrieval of the foreign object via fishing operations.
- 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.
- Upgrading the pump rising main from the stainless-steel column to a 4inch 102mm Flexibore 250 crusader hose for ease of future maintenance.
- Disinfection and cleaning of the bore pump prior to reinstallation.

Appendices:

Appendix A: Groundworks report

WaterNSW
Work Summary

GW273121

Licence: **Licence Status:**

Authorised Purpose(s):
Intended Purpose(s): TOWN WATER SUPPL

Work Type: Bore - GAB
Work Status: Replacement
Construct.Method: Rotary Mud
Owner Type: Local Govt

Commenced Date:
Completion Date: 19/09/2009

Final Depth: 216.00 m
Drilled Depth: 216.00 m

Contractor Name: NOW GROUNDWATER DRILLING
Driller: Terence Peter Guest
Assistant Driller: Alan Southwell

Property:

GWMA:
GW Zone:

Standing Water Level (m):
Salinity Description:
Yield (L/s): 20.000

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:			
Licensed:	BARADINE	BARADINE	A//414956

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: 6573506.000
Easting: 697431.000

Latitude: 30°57'19.5"S
Longitude: 149°04'00.8"E

GS Map: -

MGA Zone: 55

Coordinate Source: GPS - Global

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		Hole	Hole	0.00	2.00	406			Rotary Mud
1		Hole	Hole	2.00	190.00	311			Rotary Mud
1		Hole	Hole	190.00	216.00	197			Rotary Mud
1		Annulus	Grout	0.00	190.00	311	219		
1	1	Casing	Pressure Cemented	0.00	2.00	375	362		
1	1	Casing	Pressure Cemented	2.00	190.00	219	206		Welded - Collar
1	1	Casing	Steel - Erw	181.00	216.00	168	158		Seated on Bottom, Welded - Butt
1	1	Opening	Slots - Vertical	190.50	192.00	168		0	Casing - Plasma-cut Slot, Steel - ERW, Welded - Butt, SL: 400.0mm, A: 4.00mm
1	1	Opening	Slots - Vertical	198.00	216.00	168		0	Casing - Plasma-cut Slot, Steel - ERW, Welded - Butt, SL: 400.0mm, A: 4.00mm

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)
191.50	216.00	24.50	Unknown			20.00		10:00:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.00	2.00	Clay	Clay	
2.00	7.00	5.00	Gravel, sandy	Gravel	
7.00	12.00	5.00	Sandstone, claybound, white	Sandstone	
12.00	17.50	5.50	Sand & Stone	Sand	
17.50	24.00	6.50	Sand & Gravel	Sand	
24.00	34.00	10.00	Sandstone, yellow	Sandstone	
34.00	42.00	8.00	Sandstone	Sandstone	
42.00	47.00	5.00	Ironstone	Ironstone	
47.00	191.50	144.50	Sandstone, white & small Shale bands	Sandstone	
191.50	192.00	0.50	Sandstone, fractured	Sandstone	
192.00	216.00	24.00	Sandstone	Unknown	

Remarks

19/09/2009: Form A Remarks:
Nat Carling, 19-Nov-2009: GPS provided by the driller.
15/03/2012: Nat Carling, 15-Mar-2012; This bore has replaced GW003651.

***** End of GW273121 *****

Appendix B: Bore Location