Dam Inspection Report

Project: 1075 Horseshoe Bend Road Torquay
Report No: AGTE20249

| Geotechnical | Environmental | Residential | Pavements Investigation & Design |
Adelaide, Ballarat, Brisbane, Dingley Village, Warrnambool

Prepared for: Charlie Santospirito

9 October 2020

1. Introduction

Australian Geotechnical Testing (AGT) was engaged by Charlie Santospirito to undertake a Dam Safety Inspection for the existing Dam at 1075 Horseshoe Bend Road Torquay VIC.

Specifically, the Dam Inspection was required due to the following reasons:

- address concerns raised for the dam safety after seepage observed in the backyard of the property located immediately to the southwest corner of the dam (-38°18'15", 144°20'47").
- Address actions raised in the letter from Southern Rural Water (SRW) dated 6th October 2020, a direction under Section 80 of the Water Act 1989 (the Direction).

Figure 1 Observed Seepage Location Relative to Dam

2. Assessment of Dam Structure

2.1 Previous Information

AGT carried out a detailed assessment of the dam structure in 2017 (Report ref AGTE17463) including:

- Estimate of runoff and catchment size
- Geotechnical drilling in the embankment and foundation
- Laboratory testing of embankment and foundation materials
- Inspection of inlet and outlet pipes
- Inspection of embankment conditions
- Slope Stability Analysis

2.2 Inspection on 5th October 2020

The following were also inspected by the author of this report on Monday 5th October 2020 and included inspection of:

- The location of seepage although from a distant location due to access difficulty. However, the details recorded by engineers from SRW and other consultant onsite was discussed.
- Inlet and outlet pipes inside the embankment and examining likelihood of piping erosion.
- General embankment condition and any sign of instability.
- Reservoir and pumping operation to lower the reservoir water level

2.3 Summary of Findings from Previous Report and Recent Inspection

- The dam has minor catchment with insignificant risk of overtopping.
- The materials in the dam embankment and its foundation was mainly sandy clay with lenses of clayey sand. It was concluded some excavation was carried out inside the reservoir to form the embankment. No bathymetry of the reservoir has been undertaken.
- The moisture content of the recovered samples ranged between 13.4% and 32.2% with an average of 23%. A value of 7% was also observed that is considered as an outlier.
- No sign of embankment or foundation piping or slope instability was observed in 2017.
- Seepage was reported and observed by SRW engineers and their consultants in October 2020.
- The author discussed the observation regarding the seepage with SRW engineers and their consultant.
- The author inspected several inlet and outlet pipes and did not identify any sign of piping or internal erosion. Functionality of some pipes were tested in the presence of the client.
- The seepage is being investigated for likely source. Environmental testing is being carried out by SRW to assess chemical analytes present in the seepage water and water from the dam reservoir.

2. Addressing Actions Required by SRW

The following response and actions are proposed by the author as directed by the client.

1. *"Operate the dam at a level which is no higher than EL 12 metres as per the datum in the site plan in the AGT report number AGTE17463 dated Dec 2017"*

The pumping of reservoir was being undertaken and as per AutoCAD drawing provided to AGT the reservoir water level was at RL12m on 6th October 2020 after we carried out the inspection. This is understood to be the operating water level for the foreseeable future and until SRW is satisfied with the safety of the dam at higher water levels.

2. By 9 October 2020 establish a methodology for approval by SRW which includes surveillance markers to ensure that the dam remains at or below the safe and stable water level described in clause 1, and stable water level described in clause 1.

The author proposes use of the following equipment to ensure the water levels are monitored and maintained as per SRW's direction:

- Using a pump system with a float switch installed to operate based on water level in the dam reservoir. An automatic switch will start the run as soon as the reservoir water level reaches RL12m.
- Siphon Spillway is also a suitable method of discharging the extra head although may not be necessary due to small size of catchment and low risk of overfilling of reservoir.
- Install telemetry water level monitor of reservoir and provide access to SRW.
- Install visible markers on the embankment at RL12 on and take regular photos as part of agreed inspection plan.

3. Ensure a daily visual inspection is undertaken and recorded to observe any changes to the dam wall or ponding and seepage and ensure any changes are immediately reported to SRW via the nominated representative

The author will prepare a daily visual inspection sheet and train the site operator to follow the instruction. This will include inspection of the reservoir water level, embankment, foundation and surrounding areas for any sign of seepage or piping. This may include inspection of properties where seepage was observed of the permission can be obtained.

4. A log of the record of the visual inspections as required in clause 3 above shall be maintained and provided to SRW weekly beginning from the 6 October 2020 and anytime upon request.

The logs from the previous step will be collected and sent to SRW on weekly basis.

5. Provide an initial report prepared by an engineer with dam safety experience and approved by SRW to identify if any further mitigation measures are required to ensure the integrity of the dam wall and the safety of local residents by 5pm Friday 9 October 2020.

The author carried out a detailed review of the geotechnical investigation carried out in 2017 in conjunction with the site visit on 5th October 2020 and believes:

- The piping risk and internal erosion of the embankment is significantly low. This is considering the laboratory setting results include moisture content, Emerson class, particle size distribution and permeability tests.
- The piping risk in foundation material is low to medium. Further detailed assessment is required.
- Inlet and outlet pipes have potential for erosion around them but no sign of this was observed during the site inspection.
- Maintaining reservoir water level at RL12 will reduce the instability risk and hence reduces exposure of the community to unacceptable risks from the operation of the dam.
- Nevertheless, a detailed assessment and revision of the dam category due to increase in Population At Risk (PAR) is recommended and can be carried out within 4 weeks.
- Review the daily inspection results, undertake further investigation and carry out monitoring to ensure:
  - The dam is complying with the requirement of Water Act 1989 and guidelines provided by ANCOLD specifically “Guidelines on Dam Safety Management (2003).
  - Provide feedback from the current temporary operation from The Dunes Torquay and commercial risk to the business.
  - Assess the actual safety risk after collection of further information and monitoring to negotiate any change from the current operation proposed by SRW.

6. All other inputs into the dam, including from the golf club and water supplied from Barwon Water must cease unless there is a mechanism approved by SRW to maintain the safe and stable water level described in clause 1 of the Section 80 Direction and all other clauses therein are complied with.

It is believed the installation of automatic pump and telemetry monitoring provides adequate assurance to maintain the reservoir water level at RL12m and therefore seeking the permission to use previous sources of water to maintain the reservoir water level and allow the business to operate.

We propose a meeting to be held on 16th October with SRW to discuss the following:

- Studies to be undertaken to assist categorisation of the dam as per ANCOLD guideline including desktop, fieldwork and any other relevant work.
- Discuss the detail and frequency of monitoring and inspection and seek SRW’s approval while the operation continues at RL12 and other source of water sought to be used.

Should you need further discussion please do not hesitate to contact the undersigned.

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Appendix A – AGT Report 2017