15 May 2018

Mr Phil Gardiner
Irwinconsult Pty Ltd
Level 3, 289 Wellington Parade South
East Melbourne VIC 3002

REVISED LANDSLIDE RISK ASSESSMENT
PROPOSED APOLLO BAY RESORT, 275-305 BARHAM RIVER ROAD, APOLLO BAY

Dear Phil

1.0 EXECUTIVE SUMMARY

Irwinconsult Pty Ltd (Irwinconsult) has engaged Golder Associates Pty Ltd (Golder) to perform a landslide risk assessment (LRA) for the proposed Apollo Bay Resort located at 275 – 305 Barham River Road, Apollo Bay. Our engagement post-dates earlier studies on this site undertaken by Bruce Hollioake Consulting & Civil Engineers that were submitted in support of an earlier Planning Application for the project in July 2017.

The LRA set out in our report dated 1 November 2017 (ref: 1787175-002-R-Rev1) was based on a development masterplan that has since been revised, partly in response to our recommendations to relocate some elements of the development as a means of reducing the level of landslide risk to which the proposed development may be subject, and partly through the deletion of the second stage of the project.

This letter sets out a revised risk assessment based on the revised masterplan (drawing TP_006-F dated 3 May 2018) provided to us by Godfrey Spowers (Victoria) Pty Ltd (Spowers, the project architect), and should be read in conjunction with our report dated 1 November 2017. Note that the description of the geotechnical setting of the site and the landslide hazards identified in our LRA report remain relevant to the revised masterplan. However, the risk assessment presented in this letter supersedes our previous assessment because significant changes to the elements at risk have been made.

Our risk assessment indicates that subject to the implementation of mitigation measures in accordance with our recommendations, landslide risk can be managed and that a tolerable risk as specified in the schedule (EMO1) to Clause 44.01 of the Colac Otway Shire (COS) Planning Scheme can be achieved, i.e. to comply with the requirements of EMO1. The assessed residual risk level is generally consistent with the level of landslide risk elsewhere along the Great Ocean Road where development is permitted in accordance with the COS EMO1 requirements.

2.0 PROPOSED DEVELOPMENT

Figure 1 shows the revised masterplan which includes the following elements:

- A 180-bed hotel building comprising up to three above ground levels.
- 82 no. one to two level villa units comprising 11 no. hotel villas on the ridge to the north of the hotel, 11 no. hotel villas near the main dam to the southwest of the hotel, and 60 no. resort villas on the south side of the southern watercourse.

- Staff and maintenance facilities within the central part of the site, east of the hotel.

- A new main access road that leads to a parking area west of the hotel building (via the staff and maintenance facilities) from Barham River Road in the northeast corner of the site.

- Minor access roads from the new main access road to the villa units and tracks for CFA access.

Figure 1: Revised masterplan (Spowers drawing TP_006-F dated 3 May 2018)

The following changes have been made to the ‘original’ masterplan that formed the basis for the LRA set out in our report dated 1 November 2017:

- Deletion of several villa units that were located on the north flank of the northern ridge, as a landslide risk mitigation measure.

- Relocation (further east) of the hotel villas west of the main dam, as a landslide risk mitigation measure.

- Deletion of the proposed hotel expansion, conference centre and chapel/yoga retreat areas to the south and east of the hotel (north of the southern watercourse).

- Changes (generally minor) to the alignment of the proposed new main access road.
Relocation (further north and east, as a landslide risk mitigation measure) of the proposed villa units in the area south of the southern watercourse.

Realignment of minor access roads and tracks for CFA access.

No requirement to upgrade the old access road on the north flank of the northern ridge to provide access for the proposed development.

Irwinconsult and Spowers have indicated that proposed earthworks associated with the development will typically be minor (i.e. cut and fill typically less than 1 m high). However, there will be some locally deeper excavations associated with the lift overrun pit for the proposed hotel (up to 7 m deep with a footprint of about 20 m²) and an access path that runs from east to west through the central part of the hotel building (up to about 3 m deep). We understand that retaining walls will be built to support these deeper local excavations.

3.0 UPDATED LANDSLIDE RISK ASSESSMENT

3.1 General

The following information from the LRA set out in our report dated 1 November 2017 remains relevant to the revised masterplan:

- The description of site conditions set out in Sections 5 to 7 of our report.
- The method of landslide risk assessment set out in Section 8 of our report. Note there is a typographic error in the second last paragraph of Section 8 – we have interpreted the ‘tolerable’ risk criteria set out in the COS EMO1 to be a tolerable risk of ‘moderate’ (not ‘low’) to property with a structure importance level of 3.
- The hazards identified and described in Section 9 of our report.
- The assessment of risk to property and life set out in Sections 10 and 11 of our report, with the following exceptions:
  - No villas are proposed to be built on or at the toe of the very steep north flank of the northern ridge (element ‘1’ in Table 1 of our report). Hence, there is no longer an element at risk in this area.
  - No villas are proposed to be built on the steep slope west of the main dam (element ‘4’ in Table 1 of our report). Hence, there is no longer an element at risk in this area.
  - The proposed hotel expansion, conference centre and chapel/yoga retreat (element ‘7’ in Table 1 of our report) is not part of the revised masterplan. Hence, it is no longer an element at risk.
  - The old access road (element ‘9’ in Table 1 of our report) is not required to provide access. In our revised risk assessment we have assumed there may still be some use of this road (e.g. by maintenance staff), and have made the following alterations to the risk assessment:
    - Risk to property: Our assessment related to Hazard 3 and the likelihood of Hazard 4 remains unchanged. We have revised our assessment of the consequence of Hazard 4 from ‘major’ to ‘medium’ assuming that a closure of the road to carry out repair works would not have a significant impact on the operation of the development. The resultant revised risk level to property for Hazard 4 is ‘low’. 
Risk to life: We have assumed the old access road is on average used by 5 maintenance vehicles per day (instead of 300 vehicles per day as an access road for the development), with all other assumptions as set out in our report. This reduces the temporal probability and risk to life associated with Hazards 3 and 4 by a factor of 60. The revised temporal probabilities are $P_{T:S} = 5 \times 10^{-5}$ (Hazard 3) and $P_{T:S} = 1 \times 10^{-4}$ (Hazard 4), which correspond to a revised risk to life of $R_{LOL} = 3 \times 10^{-7}$ (Hazard 3) and $R_{LOL} = 1 \times 10^{-8}$ (Hazard 4).

- No villas are proposed to be built on the north flank of the south ridge or the uppermost terrace below the south ridge (element ‘11’ in Table 1 of our report). Hence, there is no longer an element at risk in this area.

The assessment of societal risk set out in Section 13 of our report (note that based on information provided to us by Spowers, with the reduction of the number of villas and buildings in the revised masterplan the overall occupancy of the development is expected to be significantly less than was expected when our previous assessment of societal risk was performed).

Our revised assessment of risk to property and life and recommended remedial measures is set out in the following sections of this letter.
### 3.2 Risk to property

Table 1 sets out our revised assessment of risk to property (for current conditions, i.e. no risk mitigation) for the revised masterplan. For comparative purposes we have included our assessment for the original masterplan. Risks (prior to mitigation) that are above the maximum tolerable level set out in the COS EMO1 are highlighted in red. The assessed residual risk following implementation of the recommended remedial measures is set out in Table 3.

<table>
<thead>
<tr>
<th>Element at risk</th>
<th>Masterplan¹</th>
<th>Hazard 1</th>
<th>Hazard 2</th>
<th>Hazard 3</th>
<th>Hazard 4</th>
<th>Hazard 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Villas on the north flank of the northern ridge</td>
<td>Original</td>
<td>N/A</td>
<td>High</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td><em>No villas are proposed in the area north of the northern ridge</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Villas on the north ridge</td>
<td>Original and Revised</td>
<td>Shallow rock: Low</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deep soil: Moderate</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3. Villas on gentle slopes near the main dam</td>
<td>Original and Revised</td>
<td>Low</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4. Villas on steep slopes west of the main dam</td>
<td>Original</td>
<td>Very high</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td><em>No villas are proposed on the steep slopes west of the main dam</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Hotel</td>
<td>Original and Revised</td>
<td>High</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
</tr>
<tr>
<td>6. Hotel car park</td>
<td>Original and Revised</td>
<td>Low</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7. Proposed hotel expansion, conference centre and chapel/yoga retreat</td>
<td>Original</td>
<td>Gentle slopes: Low</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate or steeper slopes: High</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td><em>Not part of the revised masterplan</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. New access road</td>
<td>Original and Revised</td>
<td>Gentle slopes: Low</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate or steeper slopes: Moderate</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
</tr>
<tr>
<td>9. Old access road</td>
<td>Original</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
<td>Moderate</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
<td>Low</td>
<td>N/A</td>
</tr>
<tr>
<td>10. Staff accommodation (staff and maintenance facilities)</td>
<td>Original and Revised</td>
<td>Low</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
</tr>
<tr>
<td>11. Villas on the uppermost terrace below the south ridge</td>
<td>Original</td>
<td>Very high</td>
<td>High</td>
<td>N/A</td>
<td>N/A</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td><em>No villas are proposed in this area</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Villas on the lowermost terrace south of the south watercourse</td>
<td>Original and Revised</td>
<td>Low</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

¹*Original* refers to the masterplan assessed as part of the LRA set out in our report dated 1 November 2017. *Revised* refers to the masterplan provided by Spowers in an email dated 2 May 2018.
3.3 Risk to life

Table 2 sets out our revised assessment of risk to life (for current conditions, i.e. no risk mitigation) for the revised masterplan. For comparative purposes we have included our assessment for the original masterplan. Risks (prior to mitigation) that are above the maximum tolerable level set out in the COS EMO1 are highlighted in red.

Table 2: Revised assessment of risk to life (current conditions)

<table>
<thead>
<tr>
<th>Element at risk</th>
<th>Masterplan¹</th>
<th>Hazard 1</th>
<th>Hazard 2</th>
<th>Hazard 3</th>
<th>Hazard 4</th>
<th>Hazard 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Villas on the north flank of the northern ridge</td>
<td>Original</td>
<td>N/A</td>
<td>8 x 10⁻⁴</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>No villas are proposed in the area north of the northern ridge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Villas on the north ridge</td>
<td>Original and Revised</td>
<td>Shallow rock: 4 x 10⁻⁶</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deep soil: 4 x 10⁻⁵</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Villas on gentle slopes near the main dam</td>
<td>Original and Revised</td>
<td>4 x 10⁻⁶</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4. Villas on steep slopes west of the main dam</td>
<td>Original</td>
<td>4 x 10⁻³</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>No villas are proposed on the steep slopes west of the main dam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Hotel</td>
<td>Original and Revised</td>
<td>4 x 10⁻⁵</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1 x 10⁻⁸</td>
</tr>
<tr>
<td>6. Hotel car park</td>
<td>Original and Revised</td>
<td>1 x 10⁻⁶</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7. Proposed hotel expansion, conference centre and chapel/yoga retreat</td>
<td>Original</td>
<td>Gentle slopes: 4 x 10⁻⁶</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1 x 10⁻⁸</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate or steeper slopes: 6 x 10⁻⁵</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>Not part of the revised masterplan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. New access road</td>
<td>Original and Revised</td>
<td>Gentle slopes: 6 x 10⁻⁷</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>3 x 10⁻⁸</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate or steeper slopes: 6 x 10⁻⁵</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Old access road</td>
<td>Original</td>
<td>N/A</td>
<td>N/A</td>
<td>1.8 x 10⁻⁵</td>
<td>6 x 10⁻⁷</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>N/A</td>
<td>N/A</td>
<td>3 x 10⁻⁷</td>
<td>1 x 10⁻⁸</td>
<td>N/A</td>
</tr>
<tr>
<td>10. Staff accommodation (staff and maintenance facilities)</td>
<td>Original and Revised</td>
<td>5 x 10⁻⁶</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1 x 10⁻⁸</td>
</tr>
<tr>
<td>11. Villas on the uppermost terrace below the south ridge</td>
<td>Original</td>
<td>4 x 10⁻⁴</td>
<td>8 x 10⁻⁴</td>
<td>N/A</td>
<td>N/A</td>
<td>1 x 10⁻⁷</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>No villas are proposed in this area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Villas on the lowermost terrace south of the south watercourse</td>
<td>Original and Revised</td>
<td>4 x 10⁻⁶</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1 x 10⁻⁷</td>
</tr>
</tbody>
</table>

¹‘Original’ refers to the masterplan assessed as part of the LRA set out in our report dated 1 November 2017. ‘Revised’ refers to the masterplan provided by Spowers in an email dated 2 May 2018.
### 3.4 Risk mitigation

A risk level of ‘high’ or ‘very high’ for property and greater than $1 \times 10^{-5}$ for life does not comply with the COS EMO1 tolerable risk criteria and mitigation measures are required to reduce these risk levels. Tables 1 and 2 indicate that, for the revised masterplan, mitigation measures are required for the following elements at risk:

- The proposed hotel (element ‘5’) – risk to property and risk to life associated with Hazard 1.
- The proposed villas on the northern ridge (element ‘2’) where a deep soil profile is present – risk to life associated with Hazard 1.
- The new access road (element ‘8’) where ground slopes are moderate or steeper – risk to life associated with Hazard 1. Note we consider our assessment of the risk to the new access road to apply to the other new roads (e.g. minor roads and CFA access tracks) proposed as part of the revised masterplan. We expect this to be a conservative but prudent approach given that minor roads/tracks are likely to be subject to much lower traffic usage than the new ‘main’ access road.

The risk mitigation measures set out in Section 12 of our report dated 1 November 2017 remain relevant to the proposed development. However, our recommendation to relocate elements at risk appears to have been adopted in revised masterplan.

A plan (prepared by Spowers) is attached to this letter that shows the layout of the revised masterplan overlaid on the approximate risk zones shown on Figure 6 of our report dated 1 November 2017. This plan indicates that no buildings are proposed in the ‘very high’ risk zone. Part of the hotel, and sections of the proposed new access roads are within zones labelled as ‘high’, and there are some proposed villa units located within ‘low’ or ‘moderate’ risk zones but close to the interface with ‘high’ risk zones. A short section of new access road is in the ‘very high’ risk zone. However, it is important to note that the risk zones shown on the plan are approximate and based on a qualitative assessment of risk to property, for buildings similar to the proposed villa units, and assuming existing conditions (i.e. without the implementation of any risk mitigation measures). As discussed below we expect it to be practical and feasible to reduce the risk to a tolerable level for the proposed development. For the proposed villa units located close to the interface with ‘high’ risk zones we provide the following specific comments:

- For the proposed hotel villas on the northern ridge, the ‘high’ risk zone relates primarily to Hazard 2 (rock fall). We understand that the villa units close to the ‘high’ risk zone will be built above the very steep north flank of the northern ridge to eliminate the risk of rock fall. We recommend that these buildings found on rock in accordance with the risk mitigation measures for villas on the northern ridge (Table 3).

- For the proposed resort villas that are located close to the interface with the ‘high’ risk zone in the southeast part of the site the recommended risk mitigation measures for the hotel (element ‘5’) will apply.

Table 3 summarises the recommended remedial measures and an assessment of the residual risk level following implementation of these measures, for the elements at risk identified above. For comparative purposes we have included the risk mitigation measures recommended based on the ‘original’ masterplan.
### Table 3: Proposed risk mitigation measures

<table>
<thead>
<tr>
<th>Element at risk</th>
<th>Masterplan(^1)</th>
<th>Intolerable risk</th>
<th>Proposed mitigation measures</th>
<th>Estimate of residual risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Villas on the north flank of the northern ridge</td>
<td>Original</td>
<td>Hazard 2 (property and life)</td>
<td>Avoid building in this area</td>
<td>N/A – element at risk is eliminated by relocation</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>Deletion of villas in this area eliminates the risk associated with Hazard 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Villas on the northern ridge</td>
<td>Original and Revised</td>
<td>Hazard 1 (life) where there are moderate slopes and a deep soil profile</td>
<td>Locate buildings where the rock profile is shallow or found buildings on rock. Engineering measures including drainage. Formal monitoring and response plan.</td>
<td>Risk reduced to shallow rock conditions or better (Property: Low; Life: $4 \times 10^{-7}$ with monitoring plan)</td>
</tr>
<tr>
<td>4. Villas on steep slopes west of the main dam</td>
<td>Original</td>
<td>Hazard 1 (property and life)</td>
<td>Avoid building in this area</td>
<td>N/A – element at risk is eliminated by relocation</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>Deletion of villas in this area eliminates the risk associated with Hazard 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Hotel</td>
<td>Original and Revised</td>
<td>Hazard 1 (property and life)</td>
<td>Engineering measures to improve drainage. Minimal earthworks and engineered retaining walls for all batters higher than 1 m or steeper than 3H:1V. Formal monitoring and response plan.</td>
<td>Reduction by at least one order of magnitude (Property: Moderate; Life: $4 \times 10^{-7}$ with monitoring plan)</td>
</tr>
<tr>
<td>7. Proposed hotel expansion, conference centre and chapel/yoga retreat</td>
<td>Original</td>
<td>Hazard 1 (property and life) where slopes are moderate or steeper</td>
<td>Do not locate buildings on moderate/steep slopes or within 15 m of these slopes. Engineering measures including drainage.</td>
<td>N/A - element at risk is eliminated by relocation.</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>Deletion of this element of the masterplan eliminates the risk associated with Hazard 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. New access road</td>
<td>Original and Revised</td>
<td>Hazard 1 (life) where slopes are moderate or steeper</td>
<td>Engineering measures to improve drainage. Minimal earthworks and engineered retaining walls for all batters higher than 1 m or steeper than 3H:1V. Formal monitoring and response plan and warning signage.</td>
<td>Reduction by at least one order of magnitude (Life: $6 \times 10^{-7}$ with monitoring plan)</td>
</tr>
<tr>
<td>9. Old access road</td>
<td>Original</td>
<td>Hazard 3 (life)</td>
<td>Engineering measures. Formal monitoring and response plan and warning signage.</td>
<td>Reduction by at least one order of magnitude (Life: $1.8 \times 10^{-7}$ with monitoring plan)</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td></td>
<td>The assessed risk to life for the revised masterplan is less than $1 \times 10^{-5}$</td>
<td></td>
</tr>
<tr>
<td>11. Villas on the uppermost terrace below the southern ridge</td>
<td>Original</td>
<td>Hazards 1 and 2 (property and life)</td>
<td>Avoid building in this area</td>
<td>N/A - element at risk is eliminated by relocation.</td>
</tr>
<tr>
<td></td>
<td>Revised</td>
<td>Deletion of villas in this area eliminates the risk associated with Hazards 1 and 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\)Original refers to the masterplan assessed as part of the LRA set out in our report dated 1 November 2017. ‘Revised’ refers to the masterplan provided by Spowers in an email dated 2 May 2018.
For the hotel building we expect it to be practical and feasible to retain the proposed locally deeper excavations for the lift overrun pit and access walkway. This takes into consideration the relatively small footprint of the proposed lift overrun pit and the orientation of the proposed access walkway which is approximately perpendicular to slope contours. All cut and fill batters steeper than 3H:1V or higher than 1 m should be supported by an engineer designed retaining wall. Further targeted intrusive geotechnical investigation works are required to inform the detailed design of the retaining walls, building footings, etc.

We recommend that drainage works are undertaken and a formal slope monitoring and response plan is implemented as part of the proposed development, in accordance with the recommendations set out in our report dated 1 November 2017.

4.0 CONCLUSIONS

Landslide hazards have been identified that in the absence of risk mitigation measures pose intolerable risk levels. However, subject to the implementation of mitigation measures in accordance with our recommendations, for the revised masterplan, we consider it to be practical and feasible to reduce the landslide risk level to meet the tolerable risk criteria set out in the COS EMO1.

A signed Geotechnical Declaration is attached to this letter. When reading Section 5 of the declaration it is important to note that the landslide risk level does not need to meet the acceptable risk criteria specified in EMO1 to comply with the requirements of the COS EMO1.

Further investigation and landslide risk assessment (e.g. a review and update of the current assessment based on the results of further investigation works for specific buildings) works will be required as part of the detailed design of the proposed development.

5.0 IMPORTANT INFORMATION

Your attention is drawn to the document titled – ‘Important Information Relating to this Report’, which is attached to this letter. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations Golder has under the contract between it and its client.
Please do not hesitate to contact Stuart Colls on 8862 3576 if you have any questions regarding the information presented in this letter.

Yours sincerely,

Golder Associates Pty Ltd

Stuart Colls
Associate

SC/DRP/sc

CC: Ros Magee (Spowers)

Attachments: Spowers plan showing the layout of the revised masterplan overlaid on the approximate risk zones shown on Figure 6 of our report dated 1 November 2017. Geotechnical declaration Important information relating to this report (LEG04, RL2)
11 Hotel Villas

180 beds

35m BAL setback

CFA access

50m BAL setback

CFA access

 Overflow parking

137 spaces

Staff & Maintenance facilities

CFA access

Existing track to be retained

New road to follow line of existing up to staff & mtce facility

New road

50 spaces

CFA access

146 m

297 m

45 car spaces

8 bus bays

45 car spaces

316 m

120m rad. CFA hydrant reach

120m rad. CFA hydrant reach

Sewer pump and storage

LPG cylinder

120m rad. CFA hydrant reach

103 m

35 m

162 m

Apollo Bay Resort

Oceans United Investments Group Pty Ltd

INTERIM Revised Master Plan

2017005

03/05/18

TP_006-F

1 : 2000 @ A1
# Geotechnical Declaration and Verification Development Application

**Office Use Only**

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**Section 1**

**Related Application**

- **Planning Application Number (if known):**
- **Site Address:** Apollo Bay Resort, 275-305 Barham River Road, Apollo Bay
- **Applicant:**

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**Section 2**

**Geotechnical Assessment and/or Landslip Risk Assessment**

- **Report Title:** Landslide risk assessment & Revised landslide risk assessment
- **Author's Company/Organisation Name:** Golder Associates Pty Ltd
- **Report Reference No.:** 1787175-002-R-Rev1, 1787175-007-L-Rev0
- **Author:** Stuart Colls
- **Dated:** 1/11/2017 & 10/5/2018

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**Section 3**

**Checklist**

- **Geotechnical Requirements (Tick as appropriate either Yes or No):**
  - [ ] Yes [ ] No A review of readily available history of slope instability in the site or related land as per <Sections 2.0 & 6.0 & Appendix B>
  - [ ] Yes [ ] No An assessment of the risk posed by all reasonably identifiable geotechnical hazards as per <Section 3.0 (007-L-Rev0)>
  - [ ] Yes [ ] No Plans and sections of the site and related land as per <Plates 1 to 3 & Fig. 1 to 5>
  - [ ] Yes [ ] No Presentation of a geological model as per <Section 7.0>
  - [ ] Yes [ ] No Photographs and/or drawings of the site as per <Figures 1 to 6, Appendix C>
  - [ ] Yes [ ] No A conclusion as to whether the site is suitable for the development proposed to be carried out either conditionally or unconditionally as per <Section 4.0 (007-L-Rev0)>
  - [ ] Yes [ ] No If any items above are ticked No, an explanation is to be included in the report to justify why

- **Is the approval subject to recommendations and conditions relevant to:**
  - [ ] Yes [ ] No Selection and construction of footing systems.
  - [ ] Yes [ ] No Earthworks.
  - [ ] Yes [ ] No Surface and sub surface drainage.
  - [ ] Yes [ ] No Recommendations for the selection of structural systems consistent with the geotechnical assessment of the risk.
  - [ ] Yes [ ] No Any conditions that may be required for the ongoing mitigation and maintenance of the site and the proposal from a geotechnical viewpoint.
  - [ ] Yes [ ] No Highlighting and detailing the inspection regime to provide the <PCA> and builder with adequate notification for all necessary inspections.

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**50 Years**

State the Design Life of the Structure adopted in the Geotechnical Assessment and/or the Landslip Risk Assessment.

- [ ] Yes [ ] No Are the risk mitigation measures as recommended in the Geotechnical Assessment and/or the Landslip Risk Assessment suitable for the design life of the structure?

**NOTE:** <Add Reference> - Add in the relevant section or page number of the listed Geotechnical Assessment and/or Landslip Risk Assessment which addresses each item

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*Reference is to section of Golder's report reference 1787175-002-R-Rev1 unless otherwise indicated.*
Section 4
List of Drawings referenced in Geotechnical Assessment and/or Landslip Risk Assessment

<table>
<thead>
<tr>
<th>Description</th>
<th>Plan or Document No.</th>
<th>Revision or Version No.</th>
<th>Date</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revised Masterplan</td>
<td>TP_006-F</td>
<td></td>
<td>03/05/18</td>
<td>Spowers</td>
</tr>
<tr>
<td>General arrangement plan, road longitudinal sections and cross-sections</td>
<td>CSK004-CSK010</td>
<td>P1</td>
<td>09/05/18</td>
<td>Irwinconsult</td>
</tr>
<tr>
<td>Site layout civil services</td>
<td>CSK003</td>
<td>P5</td>
<td>09/05/18</td>
<td>Irwinconsult</td>
</tr>
<tr>
<td>Stormwater drainage and waterway management report</td>
<td>15ME0212</td>
<td>H</td>
<td>09/05/18</td>
<td>Irwinconsult</td>
</tr>
</tbody>
</table>

Section 5
Declaration

I am a geotechnical engineer or engineering geologist as defined by the Colac Otway Planning Scheme and on behalf of the company below:

Yes [ ] No [ ]
I am aware that the Geotechnical Assessment and/or Landslip Risk Assessment I have either prepared or am technically verifying (referenced above) is to be submitted in support of a planning application for the proposed development site (referenced above) and its findings will be relied upon by the Colac Otway Shire Council in determining the planning application.

Yes [ ] N/A [ ]
I prepared the Geotechnical Assessment and/or Landslip Risk Assessment referenced above in accordance with the Colac Otway Planning Scheme and the AGS Guidelines 2007 as defined in the planning scheme.

Yes [ ] N/A [ ]
I technically verify that the Geotechnical Assessment and/or Landslip Risk Assessment referenced above has been prepared in accordance with the Colac Otway Planning Scheme and the AGS Guidelines 2007 as appropriate.

Yes [ ] No [ ]
I technically verify that the Geotechnical Assessment prepared for the planning application for the site confirms the land can meet the acceptable risk criteria specified in the schedule to Clause 44.01 of the Colac Otway Planning Scheme taking into account the total development and site disturbance proposed.

Yes [ ] No [ ] N/A [ ]
I technically verify that the Landslip Risk Assessment prepared for the planning application for the site confirms the land can meet the tolerable risk criteria specified in the schedule to Clause 44.01 of the Colac Otway Planning Scheme taking into account the total development and site disturbance proposed.

Section 6
Geotechnical Engineer or Engineering Geologist Details

Company/Organisation Name:
Golder Associates Pty Ltd

Name (Company Representative):
Surname: Colls
Given Name(s): Stuart
Chartered Professional Status: CPENG
Registration Number: 2557574
Signature:
Dated: 10/05/2018


Note: N/A = Not Applicable
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