



Summerland Peninsula Master Plan and Visitor Centre Precinct Methods

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This investigation was conducted as part of the Landscape Architecture Foundation's 2023 *Case Study Investigation* (CSI) program. CSI matches faculty-student research teams with design practitioners to document the benefits of exemplary high-performing landscape projects. Teams develop methods to quantify environmental, social, and economic benefits and produce Case Study Briefs for LAF's *Landscape Performance Series*.

To cite:

Sintusingha, Sidh and Jadida Salma. "Summerland Peninsula Master Plan and Visitor Centre Precinct Methods." *Landscape Performance Series*. Landscape Architecture Foundation, 2023. <https://doi.org/10.31353/cs1951>

The full case study can be found at: <https://landscapeperformance.org/case-study-briefs/Summerland-Peninsula>

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Acknowledgements

We acknowledge that our investigation conducted at the Phillip Island Nature Park is a part of the traditional lands of the Boon Wurrung and Bunurong people.

We thank the Phillip Island Nature Parks (PINP) team (client representatives), Leanne Renwick and Jarvis Weston, for the generosity of their time in providing invaluable insights and understandings to the innerworkings of the Penguin Parade. We thank our firm liaisons Emma Stevens and Mark Reilly of Tract Consultants. Emma has been with us through the process as an invaluable sounding board. We are indebted to Megan Barnes for her support, patience, meticulous reviews, and sharp feedback that helped improve our case study.

Research Strategy

The investigation involves two spatio-temporal scales of landscape architecture intervention: the 2012 Phillip Island Nature Parks Master Plan and its implementation in the Penguin Parade, namely the 2015 Penguins Plus viewing platform and 2019 Visitor Centre. With a long history dating back to the 1920s, Penguin Parade is Australia’s most popular eco-tourism destination and is managed by the nonprofit organization Phillip Island Nature Parks (PINP), formed in 1996. Hence there are rich, multiple sources of data and information, public and private, that we reviewed namely from the landscape architects Tract Consultants, their client PINP, and from public platforms such as Near Map, Google Maps and Trip Advisor. Tract’s PINP Master Plan, representing the overarching visions, and PINP’s annual reports (available online from 2008), representing implementations and events across the years, were key data sources. The strategy is to capture the impacts of the interventions through time, as documented and confirmed (triangulated) with the designers and client representatives and two site visits in March (Fall) and July (Winter) 2023, which is before the breeding season that commences in August. A key question is how PINP, through Tract’s master plan and landscape architecture interventions, manage the demands of a highly popular tourist destination with the conservation of sensitive penguin habitat.

Environmental Benefits

- **Contributed to an increase in conservation area of over 58% on the entire Summerland Peninsula to over 420 hectares (1,038 acres) through the government buyback of Summerland Estate from 1985 to 2010.**

- **Created and rehabilitated an estimated 6.7 hectares (16.5 acres) of penguin and wildlife habitat, a 45% increase, as part of the first phase implementation of the Philip Island Nature Parks (PINP) Master Plan and construction of the new visitor centre.**

Background:

The case study focuses on the conservation of the Little Penguin (*Eudyptula minor*), which are found throughout the southern coast of Australia and New Zealand). For more information on the penguins, refer to the 'wildlife fact sheet'

[https://www.wildlife.vic.gov.au/ data/assets/pdf file/0023/91391/Little-Penguin.pdf](https://www.wildlife.vic.gov.au/data/assets/pdf_file/0023/91391/Little-Penguin.pdf)

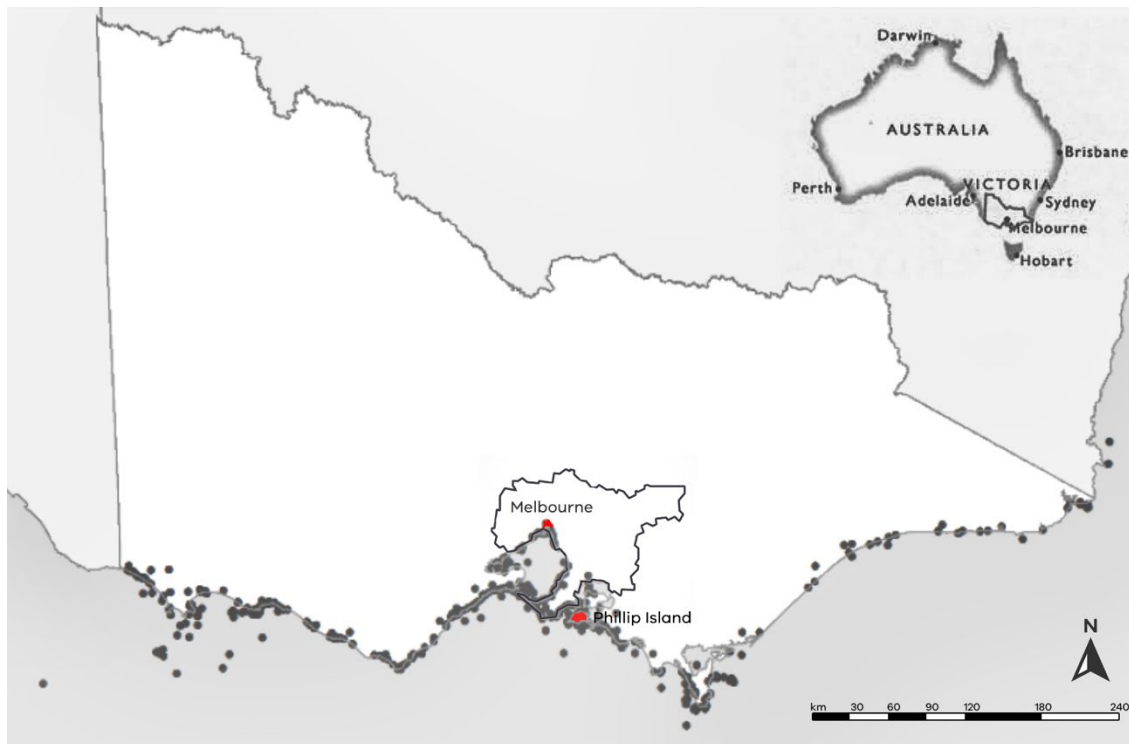


Fig. 1 Map of the penguins' recorded occurrences in Victoria 1979-2017. Source: Adapted from the Victorian Biodiversity Atlas version 15/5/2017 (records post 1979). Philip Island, where the Summerland Peninsula is located, is marked in red. We also show the extent of Melbourne's urban conurbation to illustrate the broader scale landuse pressure on conservation.

Philip Island forms part of the UNESCO-recognized Mornington Peninsula and Western Port Biosphere Reserve (Fig. 2). From Fig.2, within this Biosphere Reserve (defined by the red line), one can observe the conflicting land and marine uses between sensitive core reserves and Ramsar area and Melbourne's urban sprawl (defined by the blue line, the suburbs of Mornington Peninsula, Casey etc.).

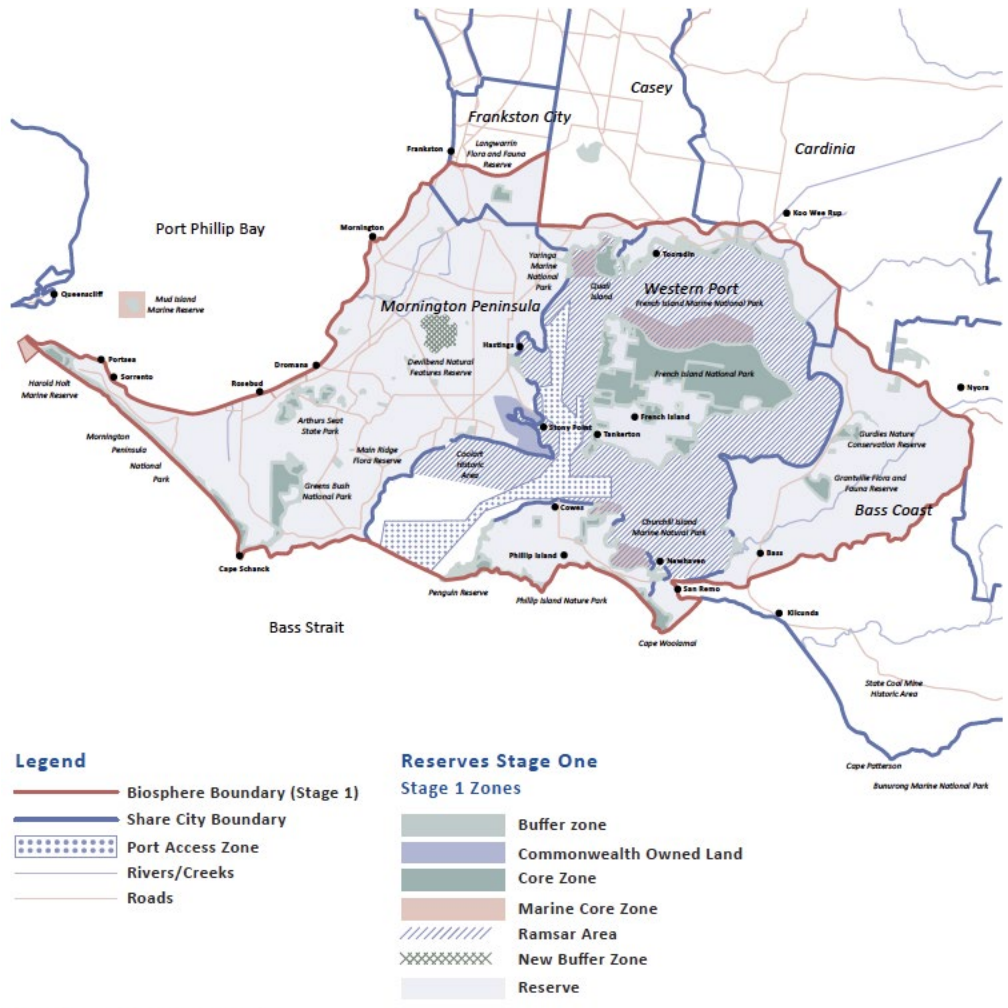


Fig. 2 (The Western Port Biosphere Reserve Annual Report, 2021, p.7)

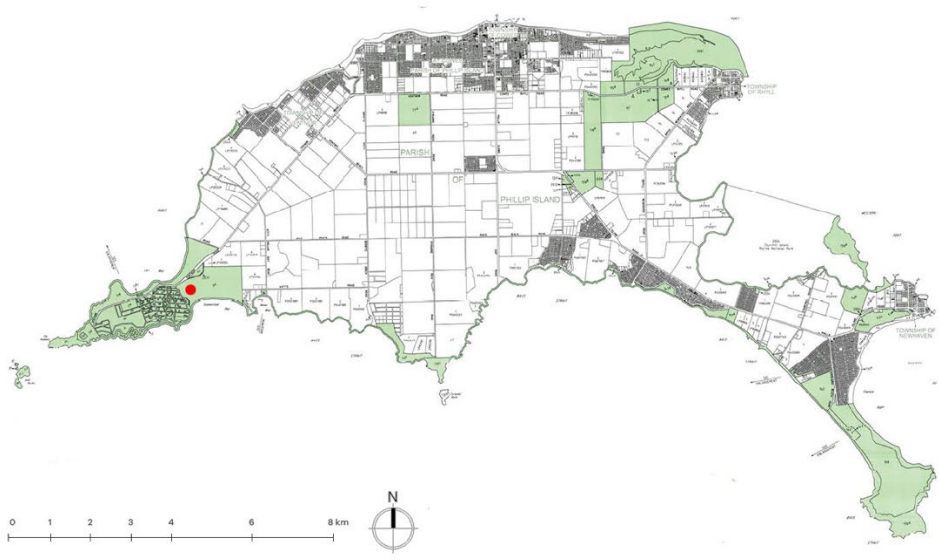


Fig. 3 The extent of the Phillip Island Nature Parks Management folio are the areas shaded green (Adapted from Tract, 2012, p.8). Summerland Peninsula is the western tip of Phillip Island. We marked the Penguin Parade area (red dot) with Summerland Beach at its south.

In Fig 3, one can observe the extent of urban and agricultural landuses in Phillip Island, including in Summerland Peninsula with the street patterns of the former Summerland Estates. Historically, Summerland Peninsula was first appropriated for agricultural use since 1872 and the first subdivision commenced in the 1920s. Ensuing developments degraded and threatened penguin habitat that occurred in parallel with conservation efforts. This included, in the 1930s, the first 10 acres penguin reserve at Summerland Beach by private donation; in 1955, first site management to protect penguins; in 1985, first site management plan that included the Summerland Estate buyback of 776 private allotments; in 1996, declaration of Phillip Island Nature Park under the Crown Lands Reserve Act 1978 (Tract, 2012, p.24). The formation of PINP and buyback completion immediately predates the master plan and informed and influenced the master planning process, its ongoing implementation and the accrued benefits documented here. In essence, Tract's master plan synthesized and translated PINP's values and vision into a long-term development and conservation strategy.

Relative to terrestrial territories, extents are far less defined in the seas and better knowledge of penguins' foraging areas are emerging with advancements in research. The Annual Report 2020-21 (PINP 2021, p.20) provided a map of "Little Penguin's main foraging area" in northern part of Bass Strait. The yellow dot (part of the original graphic) is the penguin colony that coincides with the Penguin Parade area. Across Australia's southern coast, colonies occur predominantly on islands where there are fewer human disturbances to their habitats. Penguins spend most of their time at sea and can forage hundreds of kilometers (especially during the August-February breeding season) away before returning to the colony.

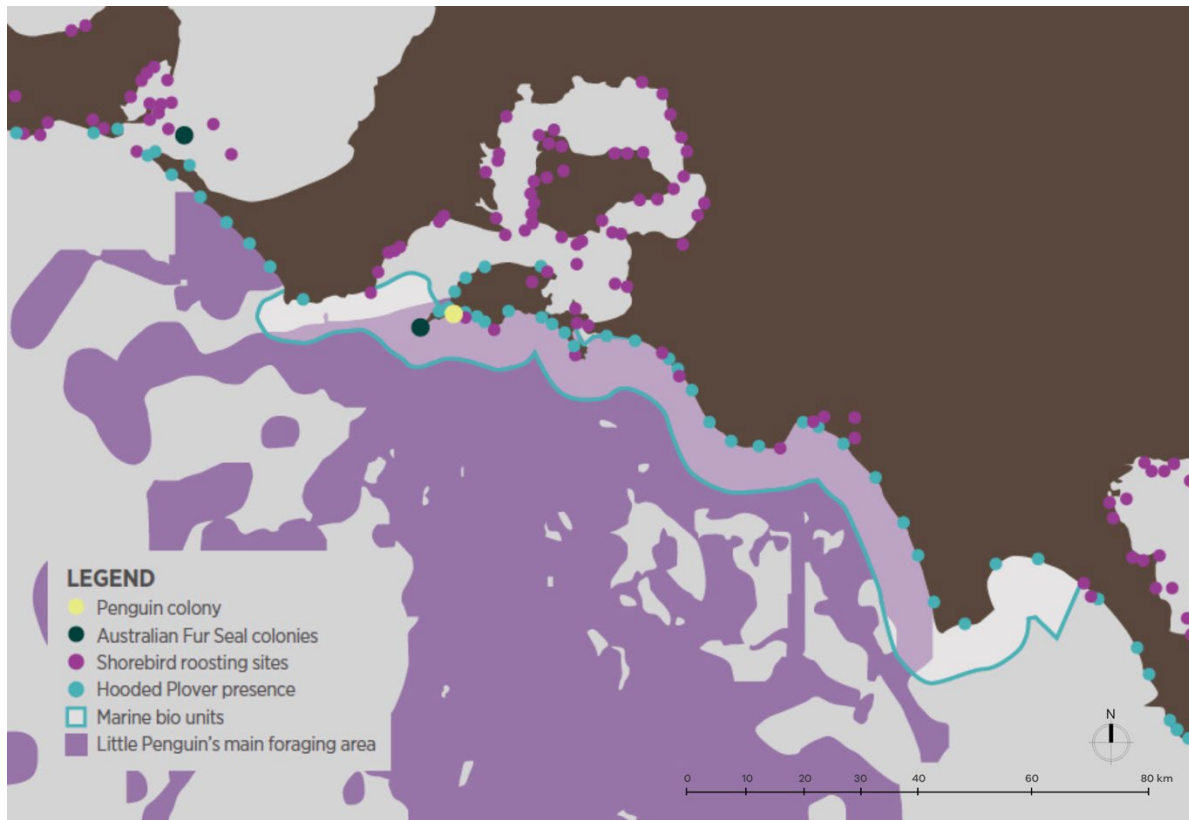


Fig. 4 Little Penguins' main foraging area, extracted from the Annual Report 2020-21 (PINP 2021, p.20)

The Summerland Peninsula Master Plan 2012 maps both natural and artificial penguin burrows in and around the reclaimed Summerland Estate (Fig. 5). The impacts of the buyback of the estate can be observed with penguins' reclamation of their habitat deep into the former estate (yellow dots of natural penguin burrows), aided by artificial penguin burrows (orange dots – also referred to as 'penguin boxes', see Fig. 6). In Fig. 5, one can observe the specific geography of the peninsula, where the Summerland Bay and the beach to the east serve as the major penguin access point from the main marine foraging area to the south (Fig. 4) to their habitat in the coastal dunes and beyond as the rest of the peninsula are predominantly steep rocky cliffs. The natural geography and landscape afford the setting for tourist viewing, over the past century, of the spectacular daily parade of penguins at sunset. On land, the cloak of darkness aids the penguins to evade predators, as their feathers provide camouflage in the waters.

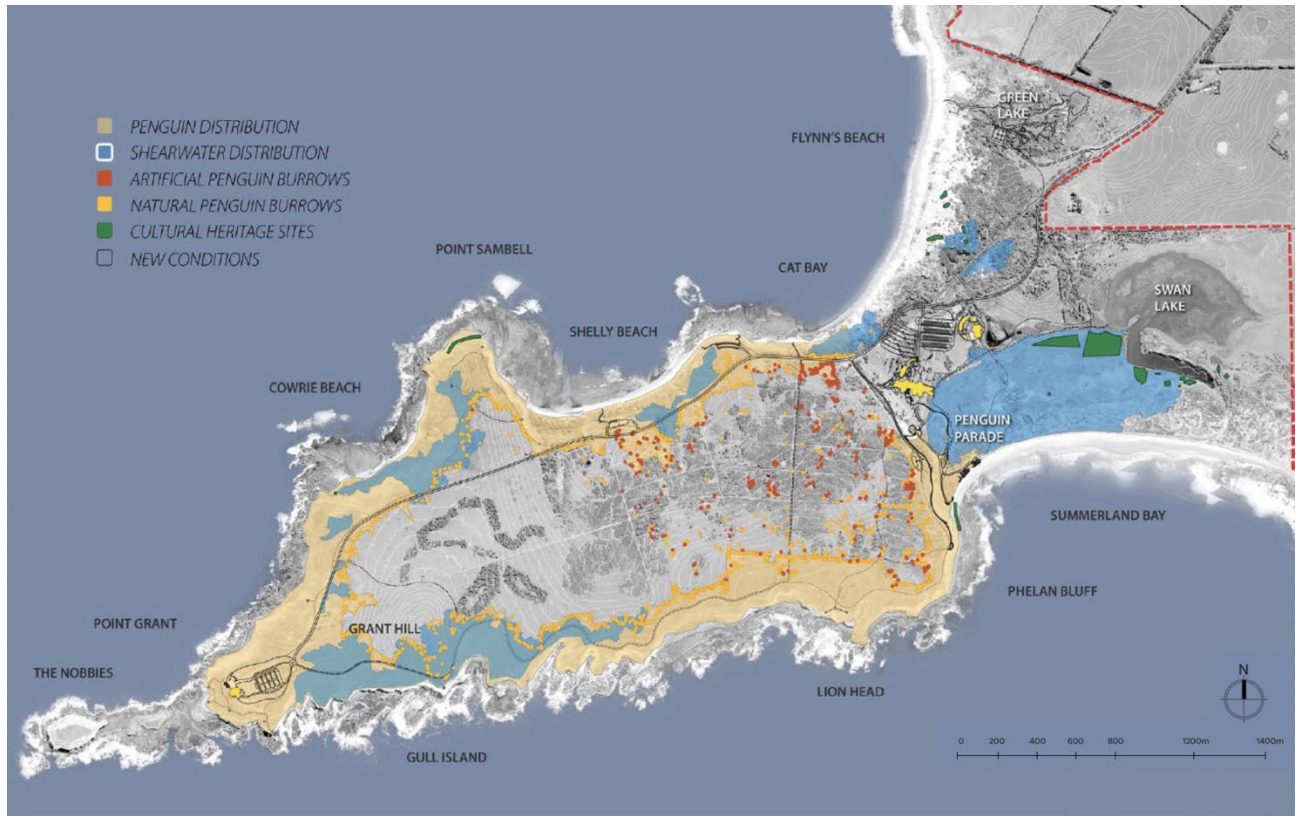


Fig. 5 'Habitat & Cultural Heritage Sites' as documented in the 2012 Master Plan. Note the Penguin Parade precinct in the east reflects Tract's proposed design concept and not the pre-existing facilities (as in Fig. 6 below). (Tract, 2012, p.36)

Zooming in further (Fig. 6) into the Penguin Parade area (and hub of the colony), where PINP mapped penguin burrow distribution in 2012 in preparation for Penguins Plus upgrade (PINP 2012, p.10). This and the previous Fig. 5 are very important as they show 1) the relationship between tourists' access (blue lines) in relation to the colony (as defined since 1988 when the previous visitor centre was completed) and 2) the habitat's expansion in both the Penguin Parade and Summerland Estate areas both naturally and aided (through artificial burrows/boxes). Outside of the Penguin Parade area, the penguin's movement (red lines represent main penguin tracks) on the land is not mapped (PINP 2023).

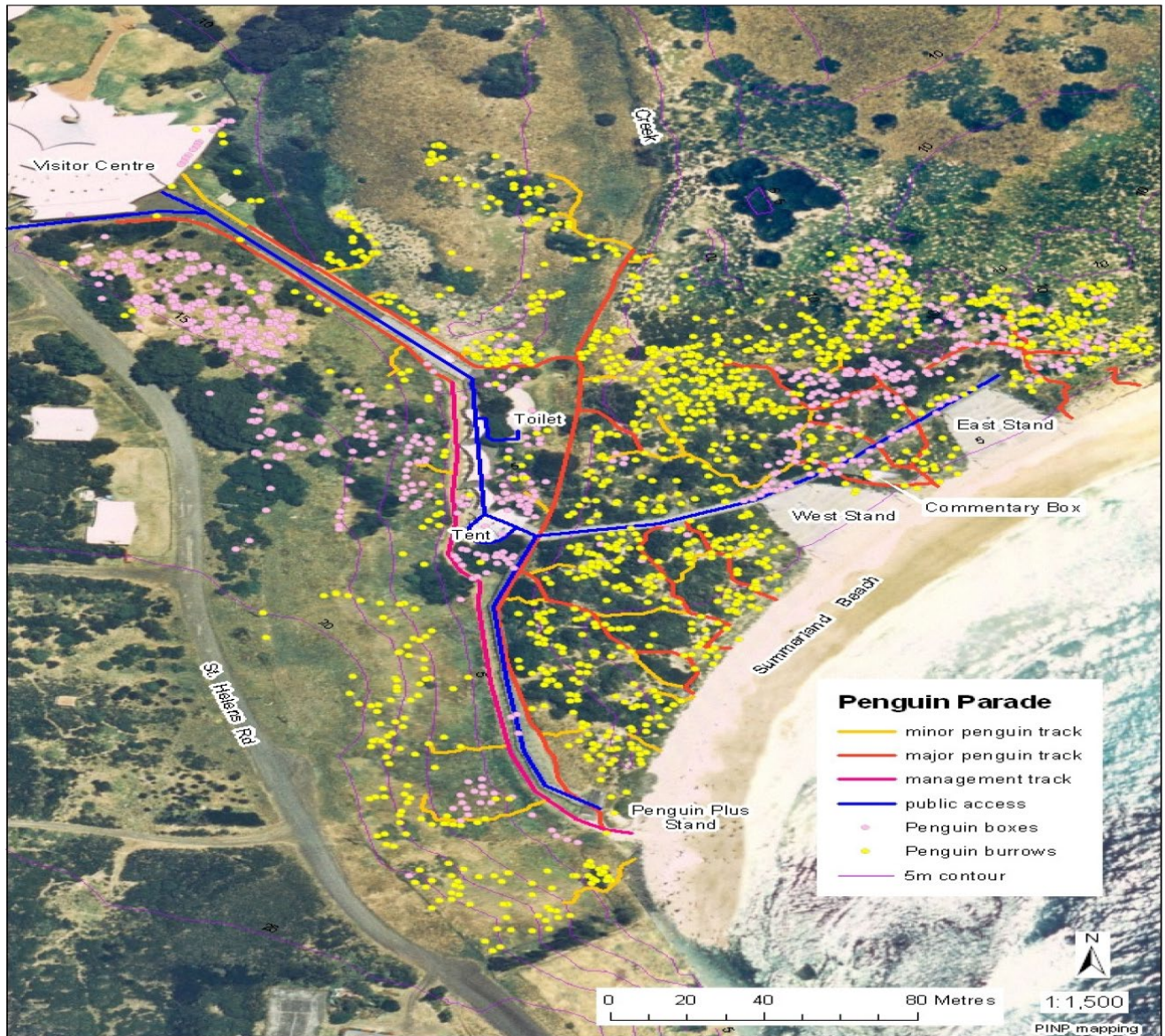


Fig. 6 PINP mapping of penguin burrow distribution in 2012. The 'public access' boardwalk and the 'Stands' provide the viewing platforms for tourists' experiences of penguins parading over Summerland Beach towards their burrows at sunset for the past century. In this image, one can already observe PINP's encouraging the expansion of penguin burrows northwards towards the (old) visitor centre (top-right of image). South of the visitor centre, one can also see the last vestiges of private houses that used to populate the reclaimed Summerland Estates.

Crucially, the penguin colony (Penguin Parade) has facilitated tourism since the 1920s and experienced over a century of human disturbances since the peninsula was appropriated for agriculture use in 1872. We surmise that the historic and cultural disturbances underpin the very close tourists' viewing proximity of penguins (fauna adaptation to human presence) as illustrated in the image from the 1950s below (Fig. 7) of penguin viewing at Summerland Beach (Tract, 2012, p.24). The close viewing continues in a more responsible manner to this day mitigated by site management and designed viewing facilities prescribed in Tract's master plan.



Fig. 7 Penguin viewing at Summerland Beach, 1950s (Tract, 2012, p.24). Note the very close proximity viewing and the use of torches.

The Summerland Master Plan (2012, p.24) further noted that the “...pattern and intensity of lands use has had a detrimental effect on habitat quality, wildlife numbers, landscape and scenic quality across the Peninsula and the effects of these patterns of land use are still evident today.” From the review of the literature and conducting the case study, we observe the consistent approach to redress these problems has been to pull back and reduce human footprint (see Fig. 8) by returning both terrestrial and marine habitat to wildlife – while balancing this with benefits and economic vitality from tourism. These are the multi-scalar background and contexts of PINP’s recruitment of landscape architects, Tract Consultants, to masterplan the Summerland Peninsula and further design the Stage 1 – the critical Penguin Parade.

In Fig. 8, the three images from the Summerland Master Plan (Tract, 2012, p.24) evidence the increased limitation, through time, of tourist access to the penguin colony and beach parade. From left to right, Penguin Parade in the 1960s where tourists (cordoned off to provide penguin access to burrows) can view penguins on the beach; aerial from 1970s with formal viewing infrastructure (concrete stands) and visitor facilities; to the aerial taken on 2011 of the previous visitor centre and defined boardwalk access and viewing of penguins in the colony.



Fig. 8 History of change – from left to right, the Penguin Parade in the 1960s, 1970s and 2011. (Tract, 2012, p.24)

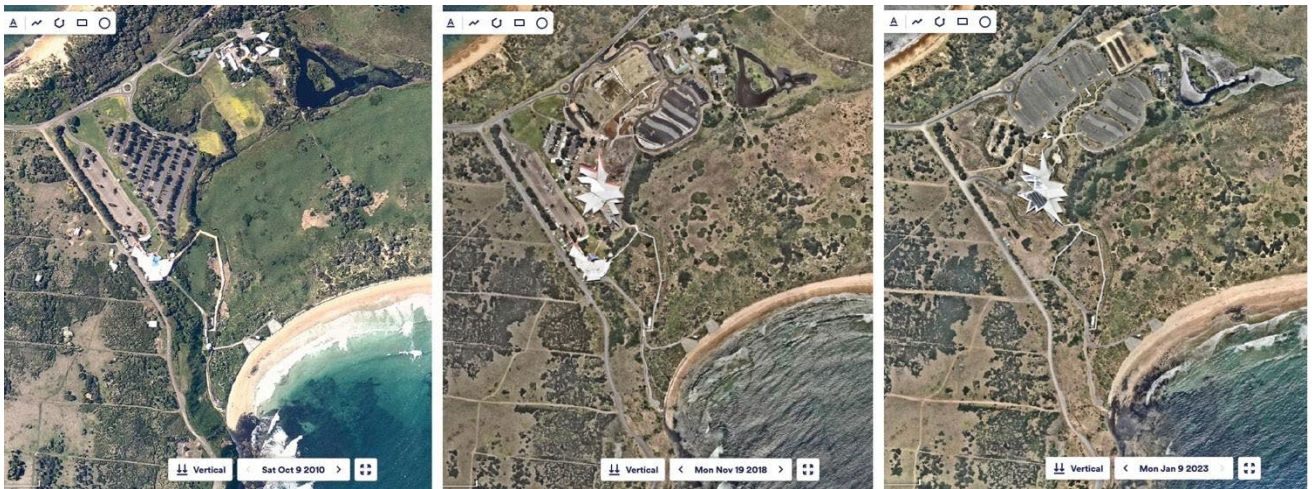


Fig. 9 The Stage 1 implementation of the 2012 master plan is captured here through the three aeriels extracted from Near Map from 2010 of the previous visitor centre (built 1988); 2018 with the construction of the new visitor centre (while the previous facility continues to function); and 2023, the condition on site as of Jan 9. The shifting of the visitor centre to the northeast facilitates the natural and aided expansion of penguin habitat to the north and into the reclaimed Summerland Estate to the east. This is further discussed below.

Method:

Literature review and desktop analyses of PINP documents, Tract masterplan and drawings, Near Map bases. We utilized Near Map ‘Polygon’ command to calculate areas. These are then triangulated with discussions with PINP research team (the client) and site visit (Jul 5, before the breeding season in Aug-Feb).

Responding to the two scales and chronology of the case study, we conduct two sets of calculations. First, we calculate the land area reclaimed from 1985 to 2010 for conservation landuse of the 776 freehold allotments (shaded brown against the green of the whole peninsula in Fig. 11). The Summerland Estate land reclamation process took longer than anticipated due to residents’ resistance (Pepper, 2018). From historic records, we assume most of the peninsula to be penguin habitats before the advent of human settlement and activities when the habitat has been severely compromised. We observe that the determining factor was the change in landuse to exclude human activities (disturbances). This is further backed up by Benefit 3 with data on the increase of penguin population through the expansion of burrows in the peninsula since the buyback of Summerland Estate begun in 1984 (Fig. 15 and 16).

The second calculation focuses on habitat net gain since the implementation of the master plan from 2012. The master plan is a very comprehensive document addressing the wide range of issues concerning the long-term development of the peninsula. The plan responds to an earlier place study and analysis of the Summerland Peninsula Strategic Framework Plan (2011) also conducted by Tract (2012, p.25). For habitat calculations, we draw attention to Fig. 10 extracted from Tract's master plan that identified additional penguin habitat of 6.7ha and an additional wetland habitat of 1.5ha. While the implemented design (see aerial in Fig. 12) evolved from the masterplan, the broad layout and design objectives are consistent.

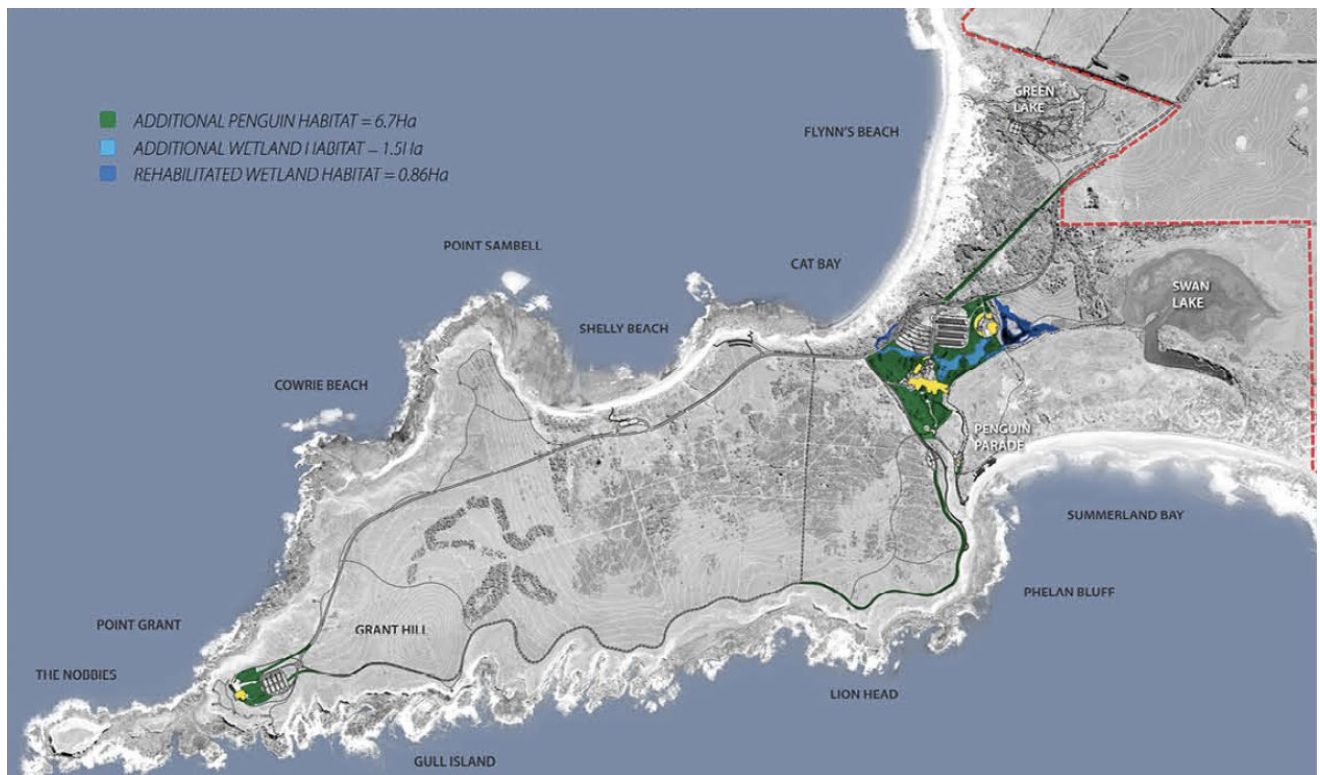


Fig. 10 Habitat Net Gain Type extracted from the Summerland Master Plan (Tract, 2012, p.61)

Note that the masterplan (Fig. 10) planned for a net gain of 6.7ha of penguin habitat across the peninsula from the Nobbies to the west, along roads extending from the visitor centre, and at the new visitor centre site to the east. We focus our calculations on the new visitor centre site, which is part of the ongoing Stage 1 implementation of the master plan. This Stage 1 implementation has been disrupted by the COVID-19 pandemic and, at the time of writing, achieved completion of two main components of the Penguins Plus (2016) and the Visitor Centre (2019). While the landscape architecture work at the visitor centre has been completed, parts of it – namely the nature islands on the car park – was completed by PINP as part of reallocation of staff tasks during the pandemic. In other words, there were expected and unexpected divergences in the implementation of the master plan and landscape architecture design.

Calculations:

- 1) 1985-2010: Calculation of Summerland Estate buyback

We utilized Near Map Polygon command to define and calculate the Summerland Peninsula area and the Summerland Estate in order to determine percentage area expansion (Fig. 11):

156.13ha (Summerland Estate)/266.56ha (Peninsula – Estate) = $\sim 0.5857 \times 100 = \sim 58.57\%$ increase



Fig. 11 Summerland Peninsula (shaded green) is defined based on extent in Tract master plan 2012. We utilized an old plan of the peninsula (Head, 2000, p.39) to aid in defining Summerland Estate (shaded brown). Penguin Parade area is to the east of the estate.

2) From 2012-present: Calculation of habitat area expansion as part of the Visitor Centre development.

We then calculated the habitat area expansion as a result of the implementation of the 2012 master plan (Phase 1) in the redevelopment of the visitor centre (completed 2019). In Fig. 11, this area is adjacent to the reclaimed Summerland Estate (shaded in brown) to the East. To determine this, we asked PINP research team to define the penguin parade area (Fig. 12) to utilize as the base area. We then measured the visitor centre areas that the PINP team conceived as habitat. This includes all the nature islands in the carpark, that not only performs as habitat but also, in contrast to the previous facility, convey a sense of entry into a naturalistic realm (of the penguins). These are discussed further under social benefits.

Note that while the PINP's rehabilitation efforts mainly focus on expanding 'penguin habitats', the benefits broadly extend to all flora/fauna (including sizable short-tailed shearwater colonies – see Fig. 5, shaded light blue). In fact, the only areas in the peninsula designed to be off-limits to penguins are the car parks. The car park nature islands serve as habitat for other flora/fauna that we observed on the site visit.



Fig.12 Approximate area (hectares) designated as 'The Parade' area by PINP research team.

New visitor centre habitat area [4.69ha (outside fence) + 1.26 (pedestrian spine) + 0.68 (large nature islands) + ~0.11ha (small nature islands)] (Fig. 13)/The Parade area [14.96ha] (Fig. 12) x 100

$$6.74/14.96 \times 100 = \sim 45.05\% \text{ habitat increase}$$

Note that this is total habitat increase, including those within the car park, the only areas penguins are kept out off in the Summerland Peninsula. The Parade area encompasses most of the main penguin burrows (Fig. 6) and a large adjacent Shearwater habitat (Fig. 5).



Fig.13 New habitat areas within Visitor Centre site including: Penguin habitat areas (shaded green) to the northwest and southwest of visitor centre building; fenced habitat area (to exclude penguin) integrated into the carpark (shaded blue).

2ha (visitor centre (vc) southwest) + 2.69 (vc northwest) [shaded green] + 1.26 (pedestrian spine between the two carparks in Fig. 13) + [0.04+0.18+0.06+0.06+0.1+0.02+0.03+0.05+0.06+0.08] (large nature islands) + [50.18x4 + 49.5 + 91.52 + 58.2 + 104.6 + 57.8 + 57.57 + 29.63 + 38.4 + 33.91 + 36.25 + 37.73 + 50.49 + 36.37 + 30.19 + 27.09 + 13.3 + 34.83 + 36.13 + 25.56 + 21.18] (small nature islands) [fenced area; shaded blue]

4.69ha [shaded green] + 1.26 (pedestrian spine) + 0.68 (large nature islands) + ~0.11ha (1070.97m² small nature islands) [fenced area; shaded blue]

= ~6.74ha

While the visitor centre's new habitat area that we calculated looks consistent with the master plan's net gain, the master plan's 6.7ha includes penguin habitat distributed across the peninsula to be delivered over a few stages. As implemented here in Stage 1, there are ~4.69ha to the northwest, west and southwest (shaded green in Fig. 13 above) of the new visitor centre that has been rehabilitated as penguin habitat. On the other hand, the areas shaded blue containing the car park and pedestrian spine are fenced and with adapted cattle grids (marked in red) installed at road entries to keep the penguins out. The nature islands within the carpark, the pedestrian spine (that incorporates a constructed wetland near the visitor centre entry) have

a combined area of ~2.05ha and performs as habitat for birds.

It could be argued that the 4.69ha penguin habitat net gain (Fig. 13) created within the visitor centre precinct is moot relative to the broader reclamation and rehabilitation of Summerland Estate. As evidenced in Fig. 5 and Fig. 15 of the penguin's expanding habitat and confirmed with the PINP team, there are no fence around the penguin habitats and penguins roam freely even across the roads within the peninsula that are closed to vehicular traffic at night. However, it must be stressed that the 4.69ha area expands northward directly on the penguin's core habitat (Fig. 6) and demonstrate significant impacts discussed further below. What could transpire in the long-term is the surrounding of the visitor centre by established penguin habitats, allowing tourists to view penguins from the centre. This is consistent with the master plan (Fig. 10) that envisions a visitor centre that is embedded in the penguin habitat and was confirmed with the PINP team. Significantly, as discussed in Fig. 9, the reclaimed and rehabilitated site becomes the patch linkage between the hub of the penguin colony at Summerland Beach (Fig. 6) to the reclaimed Summerland Estate, where PINP has been facilitating Penguin habitat expansion (Fig. 5).

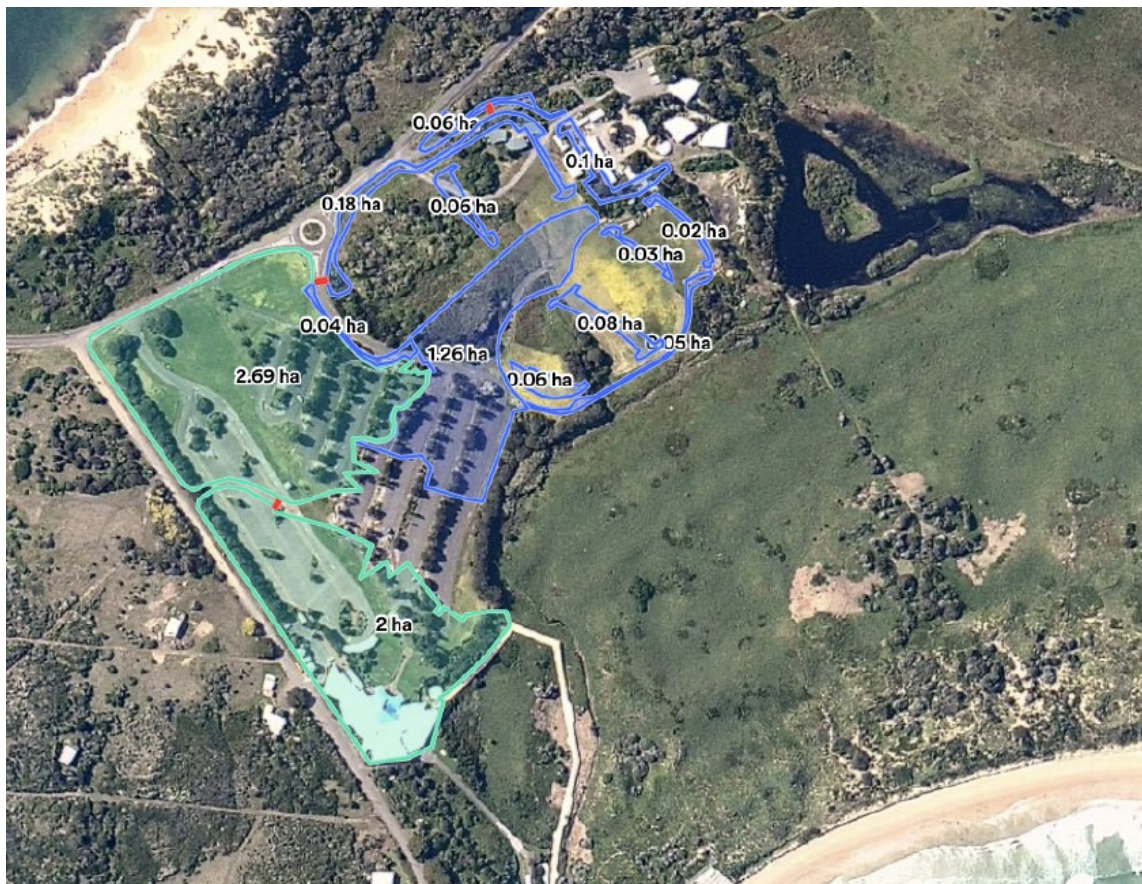


Fig. 14 outline of new visitor centre 2019 and car park overlaid on 2010 aerial. It can be observed that, consistent with the master plan, there were minimal net loss of habitat as the new facilities occupied former car parks and overflow parking areas. In fact, the 4.69ha represents net gain for the visitor centre site, reclaiming the old visitor centre, bus parking and lawn areas.

Sources:

Head, L.M. 2000. Renovating the Landscape and Packaging the Penguin: Culture and Nature on Summerland Peninsula, Phillip Island, Victoria, Australia. *Australian Geographical Studies*, 38: 36-53. <https://doi.org/10.1111/1467-8470.00099>

PINP. 2023. Phillip Island Nature Parks correspondence (May 25, 2023).

Pepper, R. 2018. "When Phillip Island penguins won, and land owners lost." *ABC News*, April 8, 2018. <https://www.abc.net.au/news/2018-04-08/phillip-island-when-penguins-won-and-land-owners-lost/9464698>

PINP. 2012. *Penguins Plus Upgrade Tender Final*. <http://www.penguins.org.au/assets/About/PDF-Tenders/Penguins-Plus-Upgrade-Tender-Final-.pdf>

PINP. 2019. Short Form Business Case Acquittal (2019).

Ernst & Young. 2015. Phillip Island Penguin Peninsula Business Case Addendum (October 7, 2015).

Tract Consultants. 2012. Summerland Peninsula Infrastructure and Procurement Summary Master Plan.

Victoria. Department of Environment, Land, Water and Planning. 2017. *Our Wildlife Fact Sheet: Little Penguins*. https://www.wildlife.vic.gov.au/_data/assets/pdf_file/0023/91391/Little-Penguin.pdf

The Western Port Biosphere Foundation. 2021. *The Western Port Biosphere Reserve 2021 Annual Report*. <https://www.biosphere.org.au/publications-resources/annual-reports/2020-2021-biosphere-foundation-annual-report-and-detailed-financial-report/>

Limitations:

- In discussions with the PINP team (2023), data on penguin movement in the water (before and after the facilities were constructed) has not been analysed yet. Penguins' foraging hotspots and marine risks are research areas identified in the Annual Report 2017-18 as important for the penguins' food security (PINP 2018, p.18). Light pollution, including from the penguin parade tourist facilities, were also identified in the report as requiring mitigation measures (p.19).
- The Annual Report 2021-22 (PINP 2022, p.19) references a research that tracked 42 penguins in 2021-22 breeding season that found 'During incubation, birds travelled up to 100 kilometers from the Penguin Parade, foraging out in Bass Strait and along the southern coast as far east as Walkerville. Guard birds, travelled less than 50 kilometers from the Penguin Parade, foraging close to the southern coast of Phillip Island (Millowl), towards Cape Woolamai. During post-guard, birds travelled less than 70 kilometers from

the colony, foraging in Bass Strait and along the coast near Kilcunda, Wonthaggi and Cape Patterson.'

- Nature Parks have since done additional penguin habitat rehabilitation works beyond the visitor centre site to achieve the penguin habitat targets of the Masterplan. What we learnt from this investigation is that, while PINP envisions the whole peninsula as *potential* penguin habitat, actual penguin habitat areas depend on both the penguin's natural expansion and PINP's rehabilitation work (Fig. 5 and 6).
- ***Contributed to a 78% increase in Little Penguin populations from 1985 to 2010 in the entire Summerland Peninsula, from 18,000 to 32,000, during the incremental government buyback of Summerland Estate. The population increased an additional 25% to 40,000 penguins from 2010 to 2020, mostly during implementation of the masterplan (starting in 2012).***

Background:

The two figures below (one from the Tract master plan and the second from Annual Report 2022) provide key data sources on penguin numbers growth and expansion of penguin breeding area via both natural and artificial burrows into the peninsula as documented by PINP on the years indicated.

On our second site visit on July 5, we observed physical evidence of the expanding colony, a penguin track up Phelan's Bluff next to Penguins Plus viewing platform (Fig. 15) that wasn't mapped on PINP's 2012 survey (Fig. 6). We looked at Near Map aerials (Fig. 16) and discovered the track wasn't apparent in the earliest image (October 9, 2010) and only appeared in the next aerial image available (March 31, 2014). The penguin track linked between Summerland Beach and the habitat expanding into the reclaimed estate, that coincides with the expansion represented in Fig. 17 and 18 below.



Fig. 15 Penguin track up Phelan Bluff. We initially misunderstood it to be a human track until a PINP ranger confirmed that it was generated by the penguins waddling up the bluff.



Fig. 16 Penguin track up Phelan Bluff (Near Map aerials). From top to bottom: October 9, 2010; March 31, 2014; and September 16, 2021. The track is absent from the 2010 aerial and PINP's survey in 2012 (Fig. 6). Whether it is classified as a 'minor' or 'major' track according to PINP's classification in Fig. 6, it was a well-used track on the night of our visit. We surmise this to be evidence of the expansion of penguin's habitat up the bluff into the reclaimed estate.

Method:

Percentage calculations are based on data sources in the 2012 Master Plan (Fig. 17) and the Annual Report 2022 (Fig. 18). They were confirmed through correspondence with PINP 2023.

Calculations:

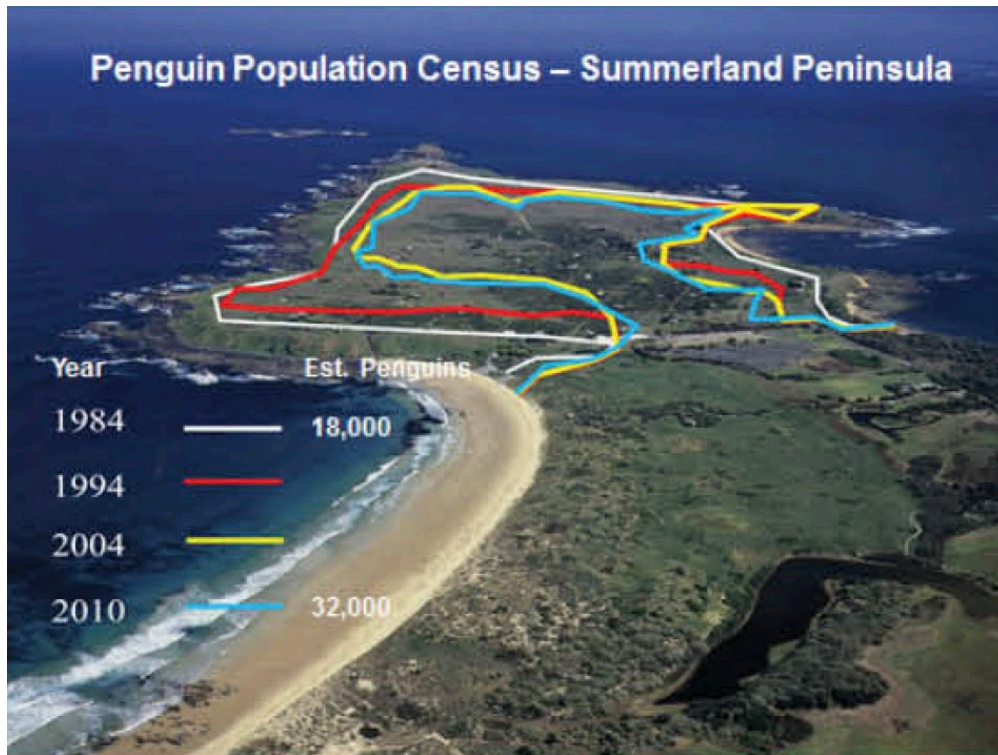


Fig. 17 “Penguin Population Census – Summerland Peninsula” as documented in the 2012 master plan (Tract 2012, p.60).

Calculation percentage increase in penguin population 1984-2010:

$$[32,000 \text{ (2010 population)} - 18,000 \text{ (1984 population)}] / 18,000 \times 100 = \sim 77.78\%$$

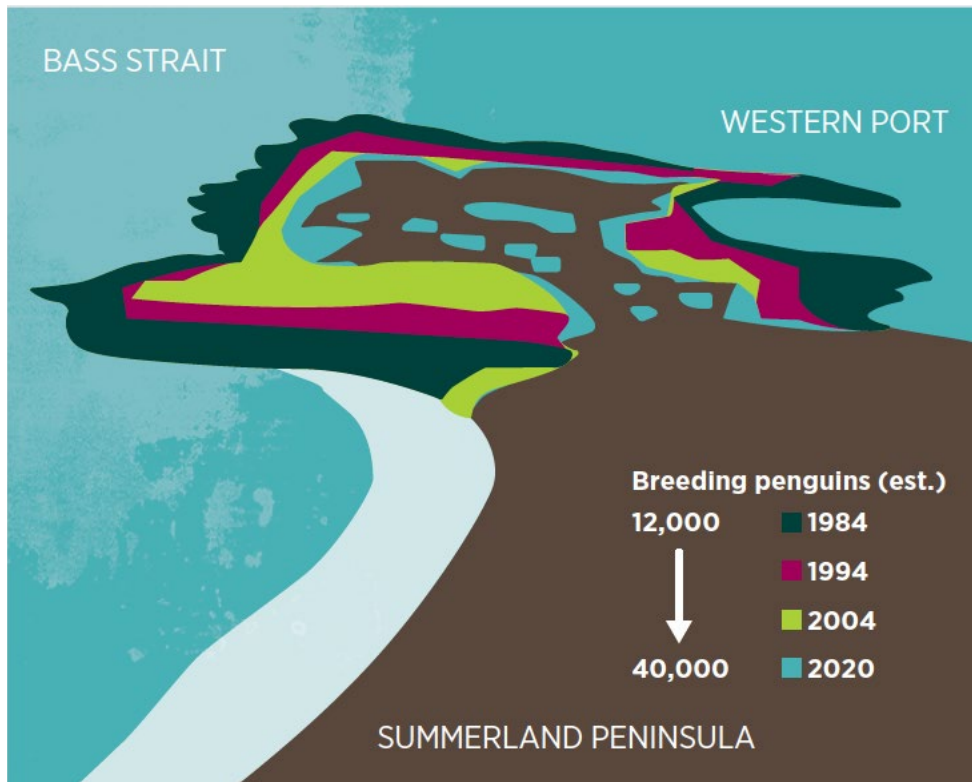


Fig. 18 “Penguin population on the Summerland Peninsula 1984 – 2020” from Annual Report 2021-22 (PINP 2022, p.19). The 2020 number is a ~8,000 increase (or 25%) from 2010, since the completion of Summerland Estate buyback.

Calculation percentage increase in penguin population 2010-2020:

$$[40,000 \text{ (2020 population)} - 32,000 \text{ (2010 population)}] / 32,000 \times 100 = 25\%$$

Sources:

Phillip Island Nature Parks. 2022. *Annual Report 2021-2022*.
<https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2021-22-ONLINE.pdf>

Tract Consultants. 2012. Summerland Peninsula Infrastructure and Procurement Summary Master Plan.

Limitations:

- While the census is accurate based on PINP’s own fieldwork, the areas in Fig. 17 and 18 are indicative based on the graphic representation (superimposition on bird’s eye view photograph of peninsula).
- **Supports a nightly average of 1,045 Little Penguins crossing the beach at Penguin Parade, which represents 1.5% increase from the period before implementation of Penguins Plus and the new visitor centre (2011-2015) to the period during and after (2016-2020).**

- ***Supported a 487% increase in mean number of Little Penguin chicks fledged per mating pair across Summerland Peninsula from 2018 to 2020, from an average of 0.31 before the new visitor centre to 1.82 chicks per mating pair after completion of visitor centre in 2019.***
- ***Supported increased establishment of Little Penguins in new boxes (artificial burrows) by 215% from 13 in the 2021-22 season to 42 in the 2022-23 season. This equates to an increase from 4% to 13% of uptake in the 318 new boxes, which is exceptional as it typically takes 7-10 years for penguins to establish in new areas and/or boxes.***

Background:

Benefits 6-8 are long and short-term benefits at different scales, outcomes related to Summerland Estate buyback (1985-2010), Tract's 2012 Master Plan and PINP's implementation of the first phase in the new visitor centre (July 2019) and Penguins Plus viewing platforms (November 2015). While we cannot claim causality as there are many variables in play (some reported below), the three benefits were formulated from correlating planning and design decisions with data in Annual Reports and further confirmed with details from correspondences with PINP.

A graph of chicks fledged per pair 1968-2022 across the peninsula in Table 3 below was provided by PINP research team. Table 2 presents the annual average numbers of penguins crossing the beach at the Penguins Parade 1977-2022. Note that many of these penguins live in areas adjacent to the Parade in the former housing estate. On the night of the site visit July 4, we observed many groups of penguins moving directly from the beach up a well-beaten path (accordingly to the Rangers, formed by the penguin's repeated use) up the cliff towards the former Summerland Estate. PINP installed 318 new penguin boxes in the new Visitor Centre habitat areas (the 4.69ha area defined in Fig. 13). Penguins usually take up to 7-10 years to establish in new areas/boxes, so the uptake has been relatively high.

Method:

Literature review and desktop analyses of PINP documents and data, including the graph (with embedded data) supplied (Tables 1, 2 & 3). Near Map bases. These are then triangulated with correspondence with PINP team and site visit (Jul 5, before the breeding season in Aug-Feb).

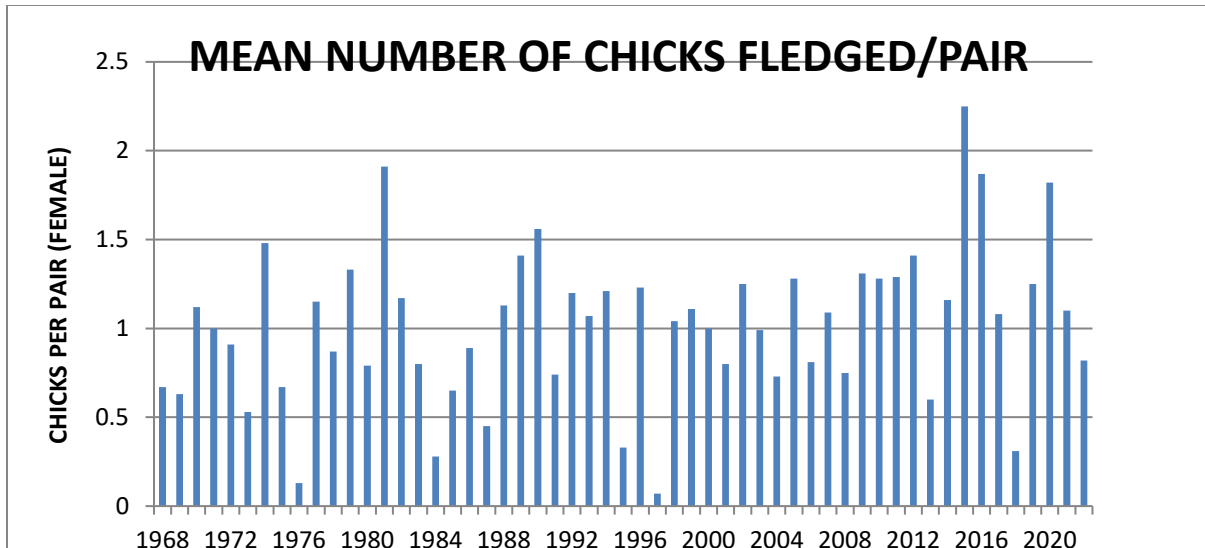


Table 1 Mean number of penguin chicks fledged/pair 1968-2022

Observations:

- From Table 2, the impact of the buyback was evident with marked increases in mean number of chicks fledged/pair from 1987 onwards. For instance, from 1987-1990 saw an increase of 270.73% $(1.56-0.45)/0.45$ from 0.45 to 1.56 chicks per pair.
- The master plan implementation begun in 2012 coincided with an increase in mean number of chicks fledged/pair of 275% between 2013-2015 $(2.25-0.6)/0.6$, noting a significant drop 2012-2013. The Annual Report 2013-14 (PINP 2014, p.14) noted that 'The average laying date of the first clutch was 27 September, one to two weeks later than previous three years. The paucity of food close to the colony is the likely cause of this low rate of breeding success.'
- The effect of the Penguins Plus (2015) or the new visitor centre (2019) is discernable. There was a record spike of 2.25 in 2015 93.97% increase from 2014 $(2.25-1.16)/1.16$ followed by a -86.22% drop to a low of 0.31 in 2018. According to the Annual Report 2018-19, this is "...most likely linked to conditions at sea" where the Bass Strait recorded the warmest water temperature that shifted fish further to cooler waters (PINP 2019, p.17). This is followed by a rise of 487.1% to 1.82 in 2020 that spans the completion of the new Visitor Centre and the outset of the COVID-19 pandemic.

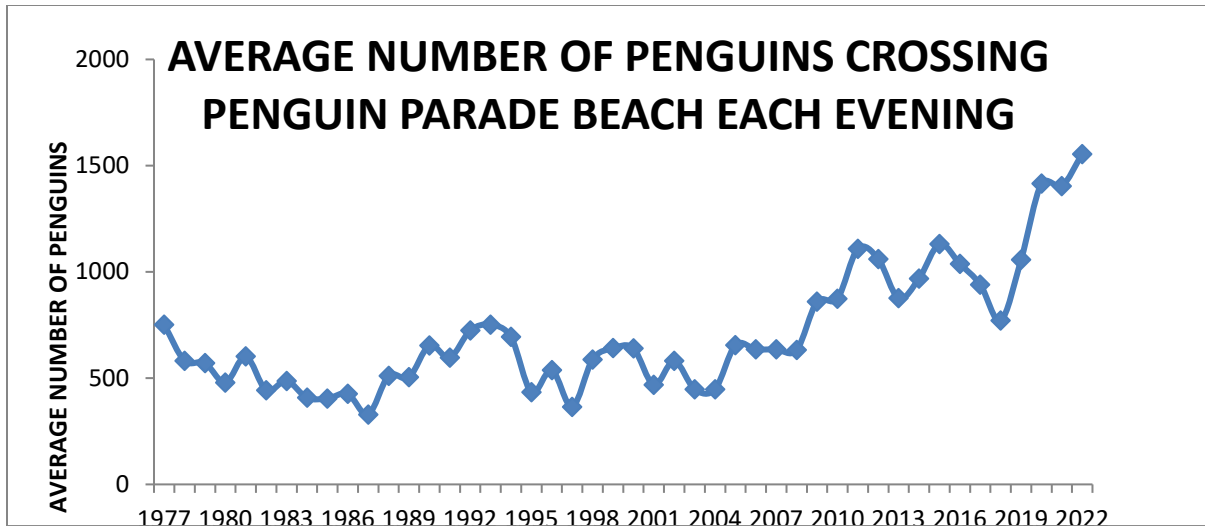


Table 2 Average number of penguins crossing Penguin Parade Beach each evening 1977-2022 presented as annual means

Observations:

- From Table 3, the impact of the buyback was almost immediate with marked increases in annual Penguin crossings from 1987 onwards. For instance, between 1987-1988 saw an increase of 55.32% (511-329)/329.
- The master plan implementation begun in 2012 coincided with an increase in average annual crossings of 29.12% between 2013-2015 (1131-876)/876.
- While, the delivery of the Penguins Plus (2015) and the new visitor centre (2019) conforms with the broad upward trends, short term drops could be a result of construction. According to Tract, Penguins Plus was built from May and November 2015. The visitor centre area was under construction from early 2018 to mid 2019 (see Fig. 9 middle Near Map 2019 aerial image). Moreover, there's a steep 45.56% increase from 2018-2020 (1416-771)/771, 2020-2022 and some of the increase could be accounted by the COVID-19 pandemic with significant drop in tourists when Victoria experienced strict and long lockdowns and international travel bans. Annual visitor numbers dropped from 719, 617 (2018-2019) to 485,030 (2019-2020) to 148,518 (2020-2021) to pick up in 2021-2022 to 218, 960. In 2020-21, the Penguin Parade was completely closed for 79 days and operated under COVID Safe Principles for 286 days (PINP 2021, p.26).
- These trends are consistent with penguin population growth on the Summerland Peninsula 1994 – 2020 (PINP 2022) and the broader reclamation of the peninsula and visitor centre area for habitats. Moreover, the 2022 report (p.19) also noted the strong increase in number of breeding penguins '... in the last 10-15 years has been due to increased ocean temperature and early breeding onset.'

Season	Number in use	Total number checked	Percent in use
2021/22	13	318	4.09
2022/23	41	318	12.89

Table 3 Penguin uptake of boxes (artificial burrows) in visitor centre site area.

Calculations:

- Benefit 7: Supported a 487% increase in mean number of little penguin checks fledged per mating pair between 2018 and 2020, from an average of 0.31 (before the construction of the visitor centre) to 1.82 chicks per mating pair (after completion of visitor centre in 2019).
 - $(1.82-0.31)/0.31 \times 100 = \sim 487\%$
- Benefit 8 Nightly average increase of Little Penguins crossing the beach at Penguin Parade from the period before the project (2011-2015) to the period after (2016-2020).
 - Average for years 2011-2015: $(1108+1061+876+969+1131)/5=1029$
 - Average for years 2016-2020: $(1038+940.5+771+1057+1416)/5=1044.5$
 - Average increase: $(1044.5-1029)/1029=1.51\%$
- Benefit 6: Increased establishment of penguins in new boxes from the 2021-22 season to the 2022-23 season in the visitor centre area. This uptake is exceptional as it typically takes 7-10 years for penguins to establish in new areas and/or boxes.
 - $(41-13)/13= 215\%$

Sources:

PINP. 2023. Philip Island Nature Parks correspondence (May 25, 2023).

Phillip Island Nature Parks (PINP). 2014. *Annual Report 2013-2014*.

<https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2013-14.pdf>

Phillip Island Nature Parks (PINP). 2019. *Annual Report 2018-2019*.

<https://www.penguins.org.au/assets/About/1904-PINP-Annual-Report-2018-19-Online-2.pdf>

Phillip Island Nature Parks (PINP). 2021. *Annual Report 2020-2021*.

<https://www.penguins.org.au/assets/About/Images-Corporate-Affairs/Annual-Report-2020-21.pdf>

Phillip Island Nature Parks (PINP). 2022. *Annual Report 2021-2022*.

<https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2021-22-ONLINE.pdf>

Limitations:

- As noted above, the study is based on establishing correlations and cannot claim conclusive causations due to the multiple variables (many unknown) affecting/influencing the habitat.
- ***Provides habitat for protected and endangered species in addition to the Little Penguins: short-tailed shearwaters, a protected species; and introduced Eastern barred bandicoot, an endangered species.***

Background:

This benefit was formulated from data in Annual Reports and PINP's 5-Year Conservation Plan 2019-2023 which states that '...Nature Parks will be working with partner agencies to achieve the best outcomes of marine and coastal protection for key wildlife such as Little Penguins, Australian fur seals, Short-tailed shearwaters and migratory and resident shorebirds' (2019, p.17). The conservation area encompasses Phillip Island and there are significant Little Penguins and shearwaters habitat distribution throughout Summerland Peninsula (Tract, 2012, p.36; see Fig. 5). Short-tailed shearwaters (*Ardenna tenuirostris*) are listed in inter-governmental agreements for the protection of migratory species (PINP, 2019, p.18) where they travel up to 15,000kms to Japan and the Arctic and back to breeding colonies in September. In 2021-2022, PINP recorded the most successful shearwaters breeding season in the 12 years of monitoring (PINP, 2022, p.19).

Eastern barred bandicoots (*Perameles gunnii* – listed as endangered) were reintroduced to Phillip Island as part of a recovery program for the species. 44 individuals were released into the Summerland Peninsula on 20 October 2017, prior the start of construction of the new visitor centre – they are now regularly seen around Penguins Plus and the Visitor Centre. Fig. 22 below shows the map of their dispersal in 2021-22. (See: <https://www.penguins.org.au/conservation/research/eastern-barred-bandicoots/>)

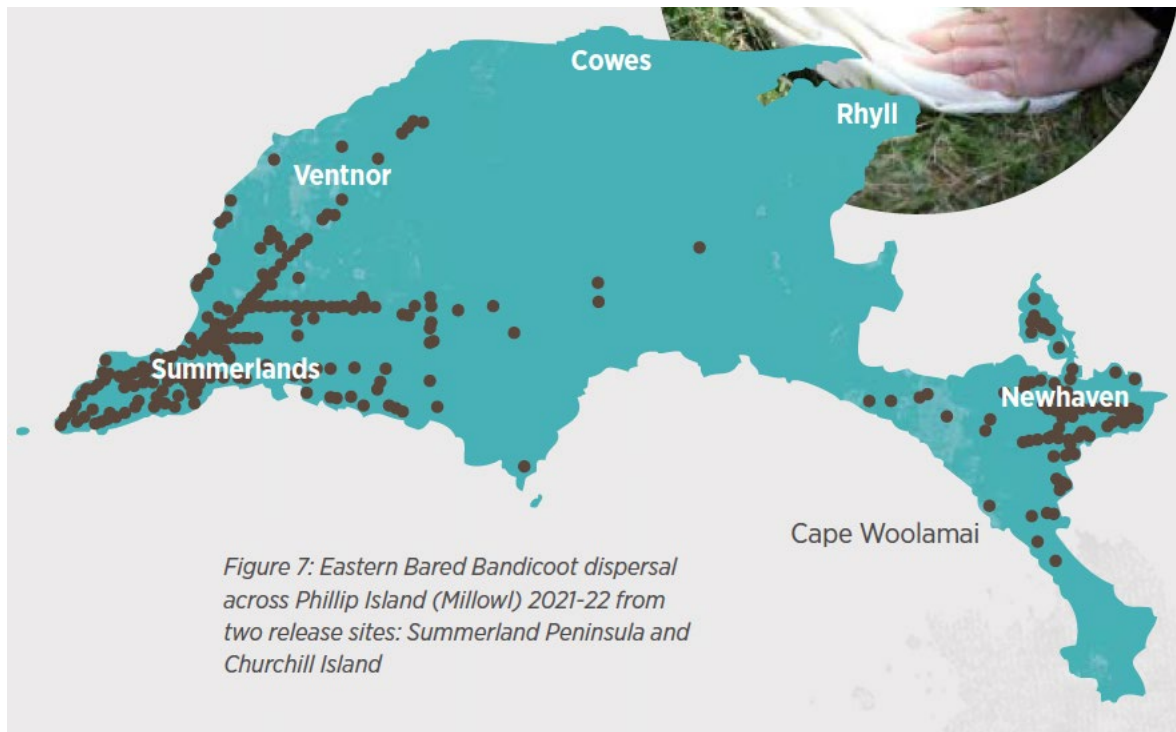


Fig. 20 Map of Eastern Bared Bandicoot dispersal 2021-22 in the Annual Report 2021-22 (PINP 2022, p.18)

Method:

Literature review and desktop analyses of PINP documents and data. These are then triangulated with correspondence with PINP conservationists.

Sources:

PINP. 2023. Philip Island Nature Parks correspondence (May 25, 2023).

PINP. 2019. 5-Year Conservation Plan 2019-2023. <https://www.penguins.org.au/assets/Updates-Feb-19/Nature-Parks-5-Year-Conservation-Plan-2019-23.pdf>

PINP. 2022. *Philip Island Nature Parks Annual Report 2021-22*. <https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2021-22-ONLINE.pdf>

Australia. Department of Climate Change, Energy, the Environment and Water (DCCEW). 2017. *Ardenna tenuirostris* — *Short-tailed Shearwater*. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=82652

- **Eliminates the need for irrigation with drought-tolerant native plants at the visitor centre.**
- **Mitigates high temperatures in penguin nesting boxes (artificial burrows) by 6-8°C (11-14°F) with mature shade trees as compared to unshaded boxes. Additional**

vegetation added over penguin boxes can further reduce temperatures and reduce time of exposure of penguins to upper thermoneutral limits by approximately 1 hour each day.

Background:

PINP confirmed results of a post-construction planting audit. The relocation and construction of the new visitor centre and carpark freed land (Fig. 14, corresponding with Fig.19 below) for rehabilitation through the planting of 41,396 plants and weed control across 3.8 hectares. Of the plants, about 61 (45 – 100L) banksia trees were planted. Weed control was also conducted on 1,197 m² in the Penguin Parade precinct as part of works and ongoing. The planting scheme and installation time yielded the broader benefit of low maintenance, eliminating the need for irrigation. Crucially, the plants provide shade for the penguin boxes (artificial burrows) that experience higher temperatures than natural burrows.



Fig. 19 Thumbnail map of revegetation area around the new Penguin Parade Visitor Centre extracted from the Annual Report 2019-20 (PINP 2020, p.18). Much of the rehabilitation was achieved through the redeployment of employees to conservation works during the COVID-19 pandemic. As confirmed by the PINP team, these works were carried out without plans.

The pedestrian spine and car parking areas were landscaped by contractors and followed Tract's designed topography and planting plans. The habitat areas were mounded and planted by PINP without plans. We confirmed this by comparing three documents (Fig. 20), from left to right Tract Construction Issue 'Surface Grading Sheet 4' #0316-0587-50 WD-104 Revision 2, dated 09.03.2018; Revision 4 of the same drawing dated 22.11.2018 (sent to us by PINP); and the grading on site from Near Map aerial dated 13.10.2019. This area is where the previous visitor centre was located (see Fig. 14). In the 2019 aerial, we can see much of the pre-existing vegetation was retained, the shape of the wetland differs from the grading plan, and the new boardwalk alignment was not implemented. We can also observe penguin boxes already installed at the time, right after the demolition of the old visitor centre.



Fig. 20 Divergence between landscape plan and implementation of the penguin habitat area in the visitor centre site.

From correspondence with the PINP team, the planting in the pedestrian spine and carpark has had a high survival rate, but in the last few months, some of the 45L banksias that were planted fail. There is a high survival of most species planted in the habitat areas, but lower survival of *Rhagodia* and *Tetragonia*, primarily due to the poor soils. PINP provided input into the Tract Plant Schedule: local provenance, EVC list and preferred penguin habitat - EVC 155: BIRD COLONY SUCCULENT HERBLAND (Department of Sustainability and Environment, 2004). PINP noted that penguins prefer breeding in certain vegetation types i.e. Seaberry Saltbush, Bower Spinach, *Casuarina* for shade etc.

PINP confirmed most of the visitor centre area was not irrigated, apart from establishment watering for the mature trees scattered throughout the pedestrian spine and carpark areas. The trees were watered from fire slip-on units on their vehicles. There was no schedule or amount, plants were watered ad-hoc for several months after periods of dry weather. PINP confirm planting usually begins in late April – August, making the most of natural rainfall.

There are ongoing studies by PINP and other researchers on heat impacts on Little Penguins which have informed planting area/species for the precinct. PINP found that shade from trees reduces the temperature inside both natural and artificial burrows (Fig. 21, right image) and have been planting more trees, particularly *casuarinas*, in penguin habitat areas. Shade from established trees provides significant reduction in temperature for the boxes of 6-8°C compared to exposed boxes. Covering the boxes with *Melaleuca* branches so the branches act as a ladder for *Tetragonia* or *Rhagodia* to grow up and cover the boxes further reduces temperature and the time of exposure of penguins to upper thermoneutral limits by approximately one hour.



Fig. 21 Left, a newly constructed penguin box or artificial burrow; Right, the boxes covered with Melaleuca branches, amidst natural burrows. (Image source: Stevens, right; Sintusingha, left July 5, 2023)

A Murdoch University PhD thesis (Clitheroe, 2021) confirms these in a study of a Little Penguin colony at Penguin Island in Western Australia. Clitheroe advocates for better design of artificial nests to mitigate for the effects of changes in terrestrial climate to arrest population decline.

Method:

Correspondence with PINP team 2023; desk top analysis of plans and aerial photos; on-site observations Jul 2023.

Sources:

Clitheroe, Erin. 2021. "Can artificial habitat mitigate impacts of climate change? Quantifying nesting habitat microclimate and use by Little Penguins (*Eudyptula minor*).". PhD thesis, Murdoch University. https://researchportal.murdoch.edu.au/esploro/outputs/doctoral/Can-artificial-habitat-mitigate-impacts-of/991005544289407891?skipUsageReporting=true&skipUsageReporting=true&recordUsage=false&recordUsage=false&institution=61MUN_INST

Phillip Island Nature Parks. 2020. *Annual Report 2019-2020*. <https://www.penguins.org.au/assets/About/PDF-Publications/Nature-Parks-Annual-Report-2019-20.pdf>

Victoria. Department of Sustainability and Environment. 2004. *EVC/Bioregion Benchmark for Vegetation Quality Assessment*. https://www.environment.vic.gov.au/_data/assets/pdf_file/0031/48757/WaP_EVCs_combined.pdf

Limitations:

- The planting design and implementation highlight the significance of ongoing post-establishment management regime – even more so for the case study in the rehabilitation of habitats of threatened wildlife. From reviewing the annual reports, as a non-profit organization, PINP also relies on volunteers for habitat rehabilitation and weeding.
- For the landscape architecture discipline, this implies opportunities to engage and collaborate with conservationists and researchers to plan and design habitats in the context of climate change.

Social Benefits

- **Supported approximately 700,000 Penguin Parade visitors annually from 2015 to 2019.**

Background:

The Penguin Parade is the most popular nature-based attraction in Australia and is a major contributor, directly and indirectly, to Victoria's tourism revenue. Before the COVID-19 pandemic between 2012-2019, it received between 500-700k visitors annually in an increasing tourism trajectory. The majority have been overseas tourists which has been significantly affected by the pandemic. In 2019-20, the visitor mix was 52% international and 48% local, the following COVID-19-affected year resulted in a mix of 9% international and 91% domestic (PINP, 2021, p.26). While PINP states in their Annual Report 2012-13, from the 27 years of monitoring, 'We found no evidence that exposure to a well-controlled ecotourism activity adversely affects the breeding patterns or success of Little Penguins' (PINP 2013, p.17). In the same document, PINP are aware of the balance and potential conflict between growth in visitor numbers and sustainability objectives, stating that 'During the year, our sustainability challenge was amplified by a 7.3% increase in the number of visitors to the Nature Park's tourism attractions' (PINP 2013, p.11). This complex balance between tourism and conservation is a fundamental challenge that Tract was recruited to address through the master plan and the Penguin Parade redevelopment was prioritized as part of the master plan's 'Implementation Stage 1' (Tract 2012, p.106).

To address the increasing tourism activities, the master plan envisaged the Summerland Peninsula as a 'recreation & tourism system' (Fig. 23) that, through various attractions around the peninsula, encourages longer stays before visitors visit the Penguin Parade in the evening.

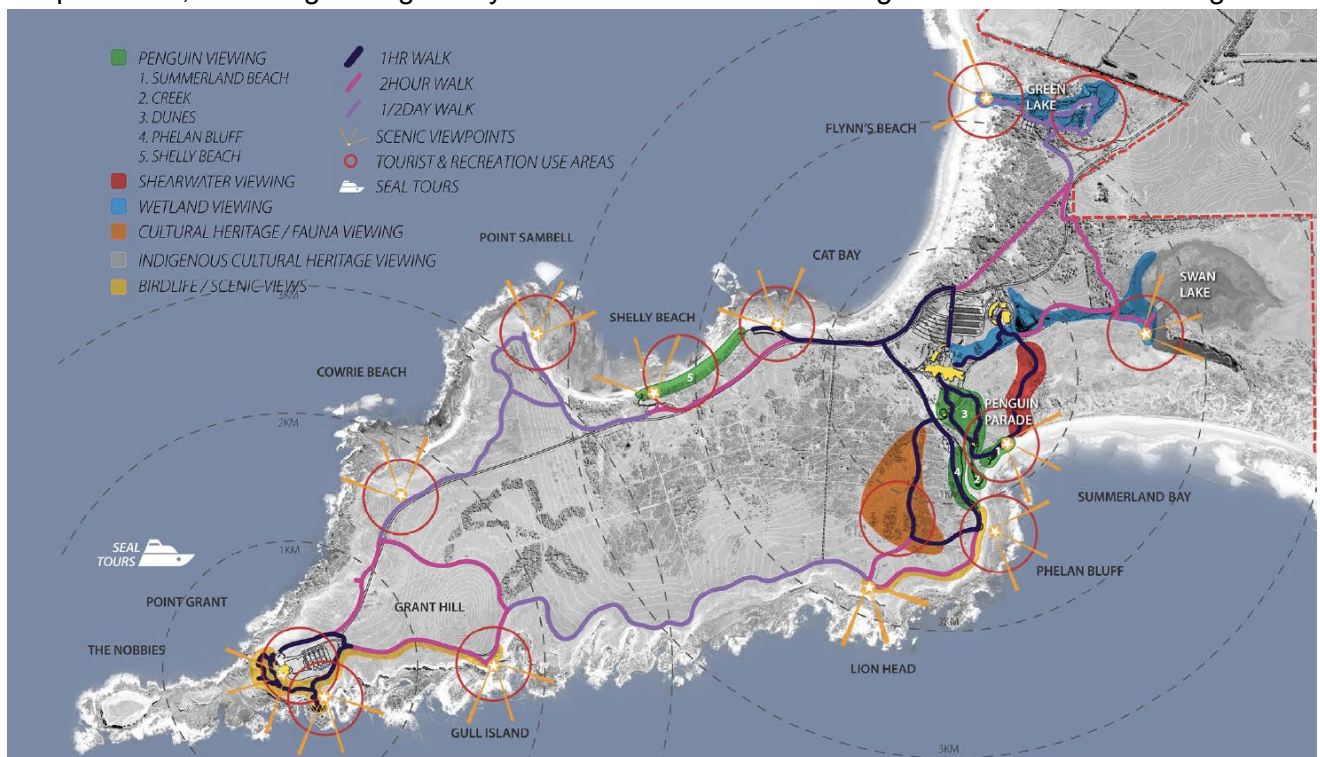


Fig. 23 Tract envisaged a 'Recreation & Tourism System' for the peninsula to expand visitation times (Tract 2012, p.65), complementing the major attraction of Penguin Parade that occurs each evening with the return of foraging penguins to their habitat via Summerland Bay.

At the time of writing, the implementation of the 2012 master plan stage 1 (the main focus of the study) is ongoing. In Figures 24-26 below, we compare the realized visitor centre precinct (Fig 26) in the context of the pre-existing conditions (Fig 24) and the 2012 master plan (Fig 25). We observe that the design philosophy, strategic concept and site planning set out in Tract's master plan have carried through in the translation of the master plan to the new visitor centre architecture (by Terroir Architects), landscape architecture (by Tract), the rehabilitation work by the clients (PINP), and the renewed Penguins Plus design (Wood Marsh and Tract).



Figure 14: Existing Conditions - Penguin Parade Arrival Area

Fig. 24 Previous visitor centre and Penguin Parade conditions (Tract 2012, p.45)

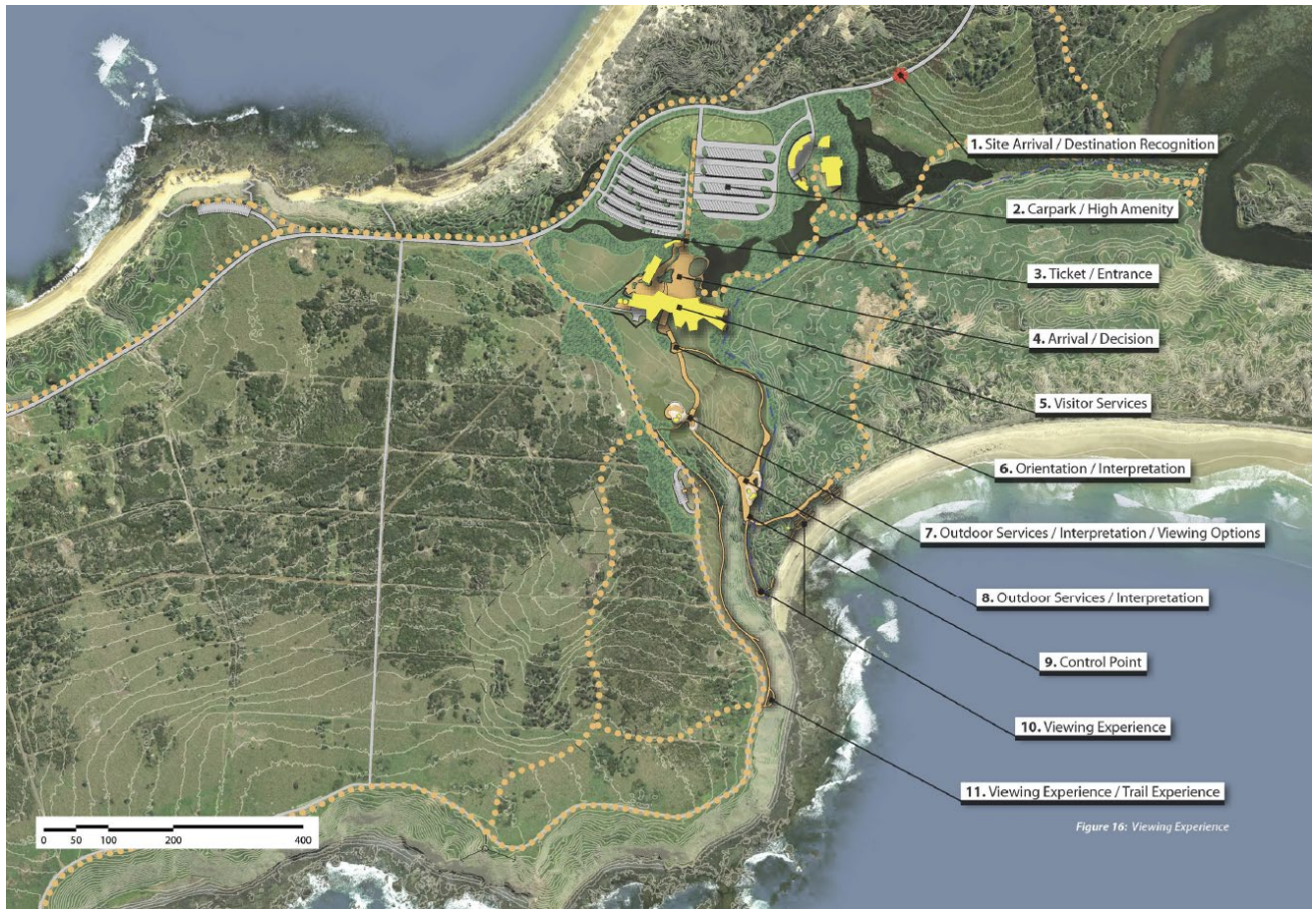


Fig. 25 New visitor experience as envisioned in the 2012 master plan (Tract 2012, p.48), embedded in a 'recreation and tourism system' (Fig. 23).



Fig. 26 Visitor centre and Penguin Parade conditions as of January 9, 2023 (Near Map aerial)

Moreover, it must be noted that the PINP is a self-funded conservation program. The revenues from the Penguin Parade and other Nature Parks attractions goes into conservation, research and education programs (documented in the PINP Annual reports). The education program includes over 20,000 school children's excursion visits each year to the Penguin Parade. from 2014 to 2019 and numerous incursion programs where the PINP team visits various schools throughout Victoria. During the pandemic, PINP ran Live Penguin TV for over 112 nights to 25 million viewers from 119 countries to a Nature Parks' global media audience of 1.84 billion people (PINP 2021, p.10 and p.26). The new visitor centre facilities further enhances these important educational activities.

Method:

Literature review, in particular PINP's annual reports 2013-14 to 2021-22.

Calculations:

2012-13 – 526,683 visitors (PINP 2013)

2013-14 – 575,476 visitors (PINP 2014)

2014-15 – 607,888 visitors (PINP 2015)
2015-16 – 693,863 visitors (PINP 2016)
2016-17 – 730,888 visitors (PINP 2017)
2017-18 – 740,899 visitors (PINP 2018)
2018-19 – 719,617 visitors (PINP 2019)
2019-20 – 485,030 visitors (PINP 2020) impacted by Victorian bushfires and COVID-19.
2020-21 – 148,518 visitors (PINP 2021)
2021-22 – 230,141 visitors (PINP 2022)

Sources:

Phillip Island Nature Parks (PINP). 2013. *Annual Report 2012-2013*.
<https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2013-14.pdf>

Phillip Island Nature Parks (PINP). 2014. *Annual Report 2013-2014*.
<https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2013-14.pdf>

Phillip Island Nature Parks (PINP). 2015. *Annual Report 2014-15*.
<https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2014-15.pdf>

Phillip Island Nature Parks (PINP). 2016. *Annual Report 2015-2016*.
<https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2015-16.pdf>

Phillip Island Nature Parks (PINP). 2017. *Annual Report 2016-2017*.
<https://www.penguins.org.au/assets/About/PDF-Publications/2017-Annual-Report-online.pdf>

Phillip Island Nature Parks (PINP). 2018. *Annual Report 2017-2018*.
<https://www.penguins.org.au/assets/assets/1665-PINP-AR-2018-WEB.pdf>

Phillip Island Nature Parks (PINP). 2019. *Annual Report 2018-2019*.
<https://www.penguins.org.au/assets/About/1904-PINP-Annual-Report-2018-19-Online-2.pdf>

Phillip Island Nature Parks (PINP). 2021. *Annual Report 2020-2021*.
<https://www.penguins.org.au/assets/About/Images-Corporate-Affairs/Annual-Report-2020-21.pdf>

Phillip Island Nature Parks (PINP). 2022. *Annual Report 2021-2022*.
<https://www.penguins.org.au/assets/About/PDF-Publications/Annual-Report-2021-22-ONLINE.pdf>

- ***Increases the length of habitat corridor that a visitor passes through by 58% from approximately 770 meters (2,526 ft) before implementation of the new visitor centre to approximately 1213 meters (3,980 ft) after.***
- ***Increases the visitor centre building's visual interface with the exterior habitat and***

landscape by 64% from 73 metres (240 ft) of the previous building's façade perimeter to 203 metres (667 ft) at the new visitor centre.

Background:

The visitor centre operations are limited to ~2 hours around the time of sunset each day (hence opening time shifts daily throughout the year). This is when the foraging penguins return to land, crossing Summerland Beach towards their burrows – nature's drama that has attracted tourists for over a century. The visitor centre is central in facilitating this tourist experience (crowd management, immersive and educative experiences) from their arrival by car whether privately or a part of group tours, the processing of tickets, viewing of exhibitions, consumption of meals and refreshments, toilet stops etc. before venturing to the Penguin Parade area.

The pedestrian spine extends from the carpark through the visitor centre's interior, linking to the Penguin Parade boardwalk alignments. The design enhances visitors experiences and awareness of protected area through the naturalistic design entry sequence and the embedding of the new visitor centre low into the landscape.

From Fig. 9 (and Figures 24 and 26 above) comparing the old and new visitor centre, one can quickly observe the longer walk for visitors from the point they alight from their cars to walk to the visitor centre and then to the viewing platforms. This is a result of pulling back the visitor centre facilities further away from the Summerland Beach penguin colony, while concurrently expanding the habitat as prescribed by the 2012 master plan (and discussed in the Environmental Benefits above). With the new visitor centre, the visitor's experience is significantly transformed. In the previous sequence, visitors move directly from the carpark to the visitor centre (Fig 27) with visitors who parked further out spending more time walking in the carpark that can be both unpleasant and unsafe. The new sequence improved wayfinding and reduced the time visitors walk in the parking space and have visitors transition into a naturalistic landscaped pedestrian spine (Fig 29) towards the visitor centre. This gives a sense of the visitor centre being embedded in the natural landscape in contrast to the previous facility where the building served as a prominent threshold between the carpark and the Penguin Parade. Consistent with Tract's master plan, the landscape assumes priority in the new scheme and, according to the PINP Short Form Business Case (2015, p.3-4), "The building sits at the low part of the landscape, nestling in below the horizon and visible only from distant and selected views" and "...deferring always to the landscape and supportive of experiences within it..."



Fig. 27 In the previous visitor centre, tourists navigate through car parking space surrounded by park-like picturesque landscape (with lawn the dominant groundcover) towards the visitor centre that, with an entry of vertical sail structures, conveys a sense of an nautical architectural landmark (that characterized a lot of 1980s recreational and tourism facilities) contrasting with the landscape and the habitat. The image sequence are extracted from Google Streetview (July 2014).



Figure 31: Main Visitor Precinct - North

Fig. 28 'Main Visitor Precinct - North' concept design in the 2012 master plan (Tract 2012, p.72). #23 and #25 are 'landscape mounding' that serves as penguin habitat reflecting the intent of extending the penguin habitat northwards to surround the visitor centre. In the master plan, the building is oriented east-west aligning with the proposed wetland habitat and new tourist trail experiences such as #19 'New Swan Lake Trail'.



Fig. 29 In the new sequence, a naturalistic pedestrian spine is introduced with mound landscaping that screens off the parking lot. The sequence of images are from a chest-mounted GoPro on the researcher’s 9-year-old son at a height of 90cm above ground. From a child’s vantage point, the parking lot disappears. The low, horizontal visitor centre almost emerges from the mound (image #8), and as one approaches the entry, reads as a spectacular sculpture clad in pixilated grey lozenge zinc scales (mimicking the penguin’s feather), befitting an internationally famed tourist destination in a conservation hotspot. The design manifests this historic contradiction – in PINP’s own words “...a world-class internationally recognised penguin viewing experience within a significant conservation zone” (PINP 2012, p.2).

The glazed façade of the building draws the habitat landscapes deep into the plan giving a sense of continuity as visitors move through the spatial sequences from the carpark though the visitor centre towards the Penguin Parade boardwalk. In effect functioning as a viewing platform, the new visitor centre design improves scenic value and nature-based visitor experiences that replaced an inward looking and visually intrusive infrastructure with site-responsive alternatives.

The realized visitor centre translation of Tract’s master plan results in a building horizontally embedded in the landscape, accessed via a landscaped pedestrian spine and a more compact entry forecourt (compared to the master plan in Fig. 28). Moreover, the orientation of the main building north-south (instead of east-west in the 2012 master plan) results in a smaller visual presence, despite the larger footprint, when viewed from both the pedestrian spine and the boardwalk to the beach. Privileging the Penguin Parade over other trail experiences (yet to be

realized), the north-south building orientation allows the pedestrian spine to continue and course into the building, exiting at the southern tip into the Penguin Parade boardwalk. Another main point of departure from the master plan is the wetlands that have limited implementation at a smaller scale as discussed in the Environmental Benefit section above. Only the Nature Parks Wildlife Rehabilitation Centre (#10 in Fig. 28) is retained.



Fig. 30 Architecture and landscape architecture design concept in Tract 2012 master plan (Tract 2012, p.73, left, and p.82, right). The master plan prescribes an outward oriented building embracing the landscape in its low, horizontal setting and plan extrusions.

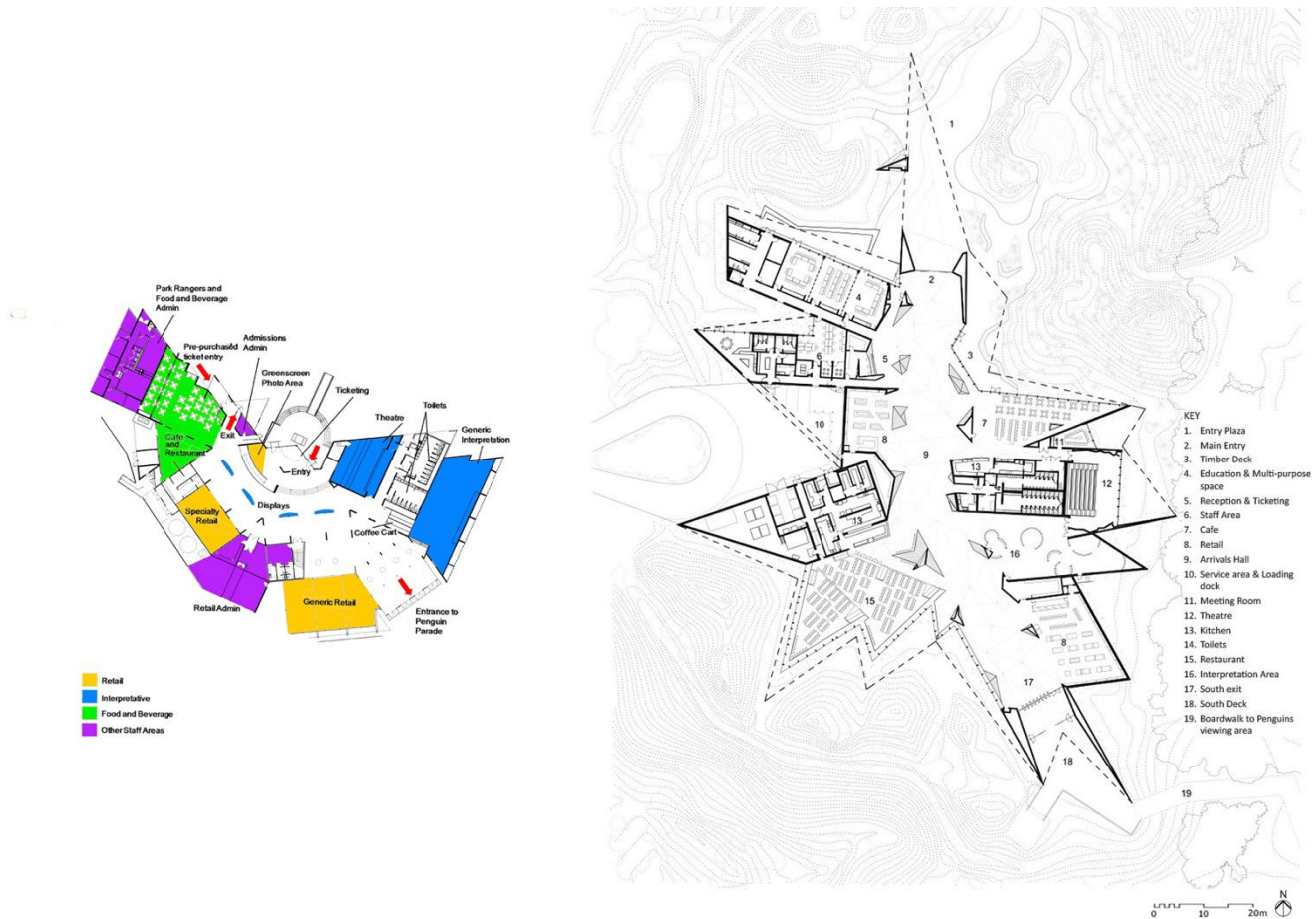


Fig. 31 Scaled comparison of the old (left) and new (right) visitor centre plans (adapted from

PINP, 2015, p.4 and <https://terroir.com.au/project/penguin-parade-visitor-centre/>). The previous visitor centre, designed by prominent Melbourne architect, Daryl Jackson, has a floor area of 2,620m² (including a 390m² 1st floor) and the new visitor centre has a 4,950m² single-level footprint.



Fig. 32 A comparison of the approach from the car park of the visitor centres in 2014 (Google Streetview July 2014) and in 2023 (Jul 2023) standing ~60m away, demonstrates the shift from the utilitarian towards an immersive habitat landscape experience.



Fig. 33 Comparing the entries to the visitor centres in 2014 (Google Streetview July 2014) and in 2023 (July). Each building reflects its time. The new visitor centre, mimicking its natural surrounds, adopts a neutral grey skin that camouflages in the landscape with abstracted geometries that evoke the penguin's physical characteristics.



Fig. 34 The new visitor centre's architectural interface with habitat. Top-left, entering the building from the north (#2 in Fig. 31, right plan) visitors are aware of the habitat to the northeast of the building and in the far background beyond. Top-right, a view of new penguin habitat to the west (from #15 in Fig. 31 restaurant). Bottom-left, looking south towards the direction of the beach (also from the restaurant), one can see penguin boxes in the middle-ground. Bottom-right, exiting the visitor centre into the Penguin Parade boardwalk (#17 in Fig. 31). The designers elect to continue the exterior geometries inside but transitioning to warmer timber tones – perhaps likened to being inside a penguin's burrow or box.

Method:

We compare the before and after tourist's walking sequence by drawing data from two sources and simulate visitor's experience at a walking speed of 1.3m/s (Mohler et al., 2007, p.222). For the previous visitor centre, we found Google Earth's Streetview retained the previous sequence (dated July 2014) and derived snapshots at time/distance intervals. For the new visitor centre, we utilized our own photo and video (GoPro) documentation on the second visit (July 5, 2013).

We utilized Near Map Line command to measure the lengths of the existing pedestrian circulation (boardwalk alignments) and new extensions (Fig 35). The main circulation spine through the building is conceived continuous from the exterior circulation from which the views of the landscape, especially the rehabilitated habitats to the west and southwest, can be experienced in the background via the glazed facades (Fig 34). We compared and measured the old and new visitor centres' plans to determine the interfaces with the habitat landscape. In contrast to the inward-oriented plan of the old centre, the exterior landscape is always visible from the new visitor centre's main central circulation spine (Fig 31 and Fig 34).



Fig. 35 Pedestrian circulation distances as measured on the Jan 9 2023 NearMap base. The green lines comprise the pre-2019 Penguin Parade boardwalk alignment; the blue lines represent the extensions of pedestrian circulation in habitat; while the orange line represents the interior main circulation spine. (North direction is left of image)



Fig. 36 A superimposition of the post-2019 pedestrian circulation on the Oct 9 2010 NearMap base. One can clearly see the manifestation of the 2012 master plan's prescription of pulling visitor centre facilities further back from the main penguin habitat by Summerland Beach and the extension/expansion of the habitat experiences. (North direction is left of image)



Fig. 37 Measuring the glazed façade length with public views to habitat of the old and new visitor centres. The green lines represent the glazed facades with views of habitat (both existing and rehabilitated). Refer to floor plans in Fig 31.

Calculations:

Calculation of percentage increase of pedestrian circulation in habitat:

$\sim 443.17\text{m}$ (new pedestrian circulation in habitat)/ $\sim 770.31\text{m}$ (pre-2019 Penguin Parade boardwalk) $\times 100 = 57.53\%$

Calculation of percentage increase of glazed façade with public view of habitat:

Old visitor centre: $29.16+3.81+13.37+27.1 = \sim 73.44\text{m}$

New visitor centre: $27.19+8.22+46.05+5.73+16.67+13.69+85.81 = \sim 203.36\text{m}$

$(203.36-73.44)/203.38 \times 100 = 63.89\%$ increase

Distances were measured from Near Map.

Sources:

Google Earth Street View (July 2014)

Mohler, B.J., W.B. Thompson, S.H. Creem-Regehr, H.L. Pick Jr, and W.H. Warren Jr. 2007. "Visual flow influences gait transition speed and preferred walking speed." *Experimental Brain Research* 181 (March): 221–228. <https://doi.org/10.1007/s00221-007-0917-0>

Limitations:

- The walking speed in the new sequence was based on the child's walk on July 5. The walk was punctuated by a lot of stops at interesting features and to avoid bird stool in the pedestrian spine – which does enhance a sense of being in the wild. Children are important variables unpredictably affecting how much time a family spends at the Penguin Parade.
- The COVID-19 pandemic ensued only a few months after the new visitor centre opening, which severely curtailed local and international tourism. This made it impossible to gauge the impact of the visitor centre in managing increasing visitor numbers, at least at the time of writing when tourism has not recovered to pre-COVID-19 levels.
- ***Increases visitor capacity by 75% from 200 to 350 per night with the renovation of Penguins Plus to enhance viewing experiences of the Penguin Parade and colony.***

Background:

This benefit concerns visitors' viewing and experience of the Penguin Parade, namely the return of the foraging penguins at sunset each day to land, crossing Summerland Beach towards their burrows. Right before sunset and the penguins' arrival, visitors are expected to be at one of four viewing platforms, the two original concrete stands (bleachers) and the smaller timber platforms to view the beach crossing. The viewing often lasts ~30mins and, as fewer penguins trickle in, the crowd of people flows back inland towards the visitor centre and carpark where they have opportunities, along the boardwalk, to view the penguins up close within their colony as they return to their burrows.

Penguin Parade has a tiered ticketing scheme (see: <https://www.penguins.org.au/buy-tickets/group/1>) with the base general viewing option of the concrete bleachers that steps down towards Summerland Beach, offering a stadium-like experience of the beach (distant views of the penguins). The case study focuses on the next price points of Penguins Plus, which was a redesign (as part of the 2012 Master Plan) along the previous alignment parallel to one of the main penguin and 'management' tracks (Fig. 6), as well as a small creek. Due to this, the penguins come in greater numbers (Table 4) and walk right along the edge of the viewing platform and timber boardwalk allowing for very close viewing (intimate scale – see Figures 40, 47, 48, and 49 [bottom-right]).

The apparent difference between the previous Penguin Parade (Fig 38, 40) and the new (Fig 37, 39) is the sinuous forms of the new boardwalk, railing and viewing platform – that along with the reduced elevation and detailing, offers better vantage points of penguins' movement along the main track to their burrows. Another key addition is the bunker under the new Penguins Plus platform that, in lowering visitor's vantage point, opens up a contemporary zoo-like (embedded in habitat) view of the penguin's movement in profile. On the two levels, the visitor capacity has been increased from 200 to 350 per night (PINP, 2012, p.2)

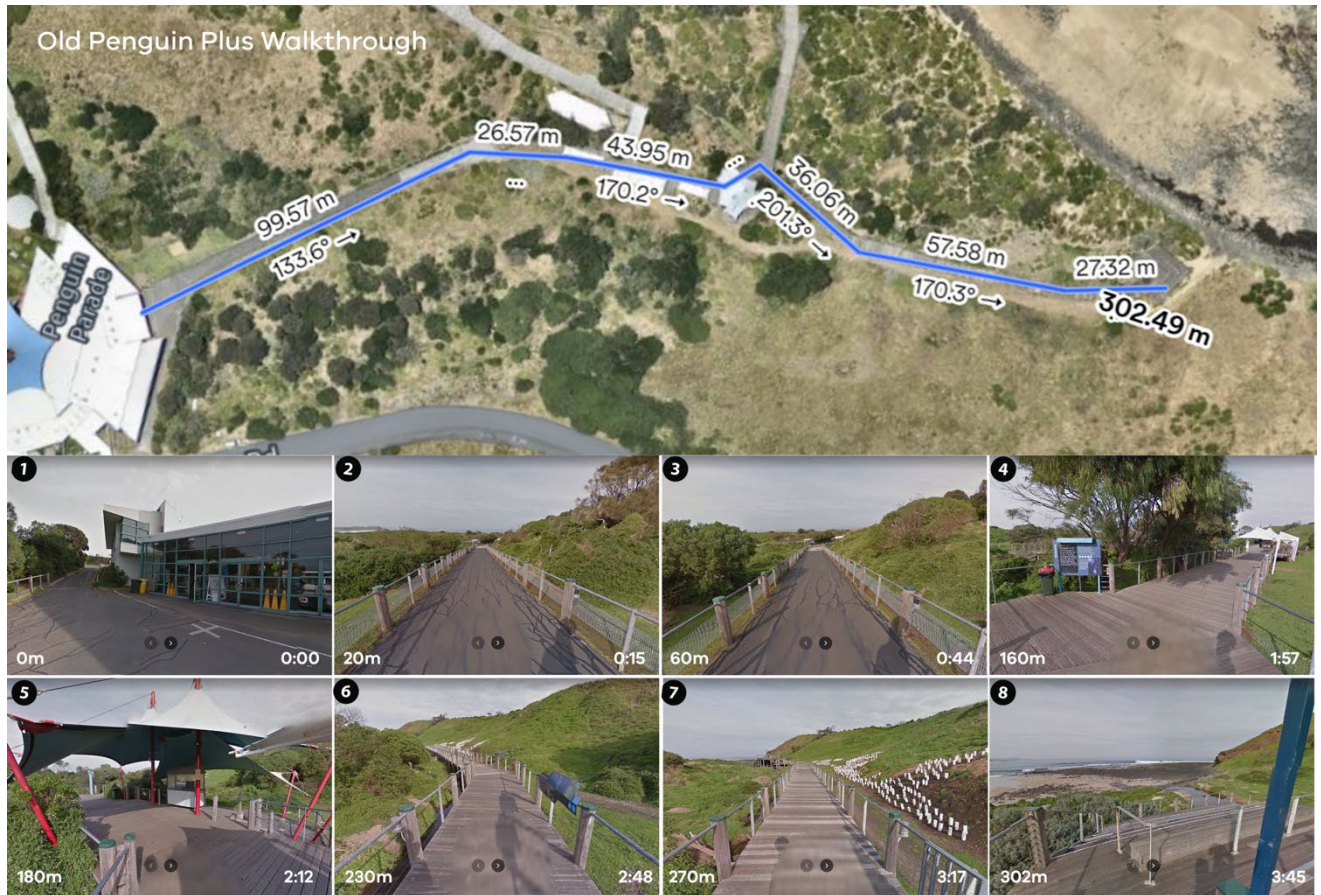


Fig. 38 Previous Penguin Parade before upgrade in 2015. The photograph sequence was drawn from Google Streetview dated (July 2014). Reviewing the Google Streetview, it can be observed that the boardwalk was elevated higher above ground level compared to the renewed boardwalk.



Fig. 39 'Design elements' in the 2012 master plan (Tract 2012, p.75). Of these, #12 Penguins Plus viewing platform and boardwalk has been implemented (opened 2016). Tract proposed a linear viewing platform extension that is parallel to the beach. The master plan proposed upgrading the whole pre-existing boardwalk alignment and new trail routes into surrounding habitat areas. These are part of PINP's ongoing projects at the time of writing.



Fig. 40 While there are variations in plan, in section there's consistency between Tract's design concept of Penguins Plus in the master plan (Tract, 2012, p.79) and as realized (Source: <https://www.landscapearchitectureprojects.com/projects/2018/7/19/penguin-plus-viewing-area>). The curvilinear language of the boardwalk is continued to the viewing platforms with a curved plan

and stepped profile. A viewing bunker, accessible at a higher price point than the viewing platform above, is inserted under the platform allowing eye-level views of penguins through the horizontal, curved fixed-glass fenestration.

East	Center	West	Far West
59	17	19	149
46	8	14	112
19	6	6	5
1	4	1	16
23	4	14	29
8	2	4	138
8		2	56
5		19	2
6		3	23
7		1	2
		7	1
		1	27
		3	18
		1	14
		8	17
		7	
		4	
East	Center	West	Far West
182	41	114	609

Total: 946

Table 4 Penguin count on the night of site visit July 5, 2023 (by PINP rangers). The Penguins Plus is located at the 'Far West', where the majority of penguins cross to their burrows.

Phillip Island
NATURE PARKS

User:

Mode: Parade counts edit

Date: 04/03/2023

East	Center	West	Far West
12	47	1	10
147	12	1	79
94	16	13	3
18	5	5	2
143	7	12	330
23	5	17	59
38	7	25	39
57	14	15	29
		19	22
		47	39
		4	30
		6	8
		3	15
		6	68
		7	4
		1	14
		9	
		2	
		20	
		13	
East	Center	West	Far West
532	113	226	751

Total: 1622

Table 5 Penguin count on the night of site visit March 4, 2023 (when our research assistant visited) towards the end of the breeding season. Note the much higher number of penguin returning to their burrows and a more even penguin distribution between the east and far west.



Fig. 41 New Penguins Plus walk (#5 to #8 in image sequence). The extension of the boardwalk and habitat expansion (compared to the previous facility) increase opportunities to view the penguins in their habitat.



Image from www.penguins.org.au

Fig. 42 The previous Penguins Plus viewing platform and boardwalk with the two general viewing stands in the background to the east. The previous visitor centre can be seen to the top-left of the image. Note the artificial lighting that treat the beach as a stage, privileging visitors' experience. Similarly, the boardwalk lighting focus on visitors' navigation and views of penguin's trail (see details in Fig. 44).



Fig. 43 Sinuous lines of the renewed Penguins Plus viewing platform and boardwalk that is responsive to the natural topography, lying lower in the landscape. To the right, a smaller viewing platform for small, guided group tours was built at the same time as the Penguins Plus. Note the new visitor centre barely visible on the top-left corner of image. (Source: Marcus Wong in <https://www.flickr.com/photos/legoblock/51149420160>)

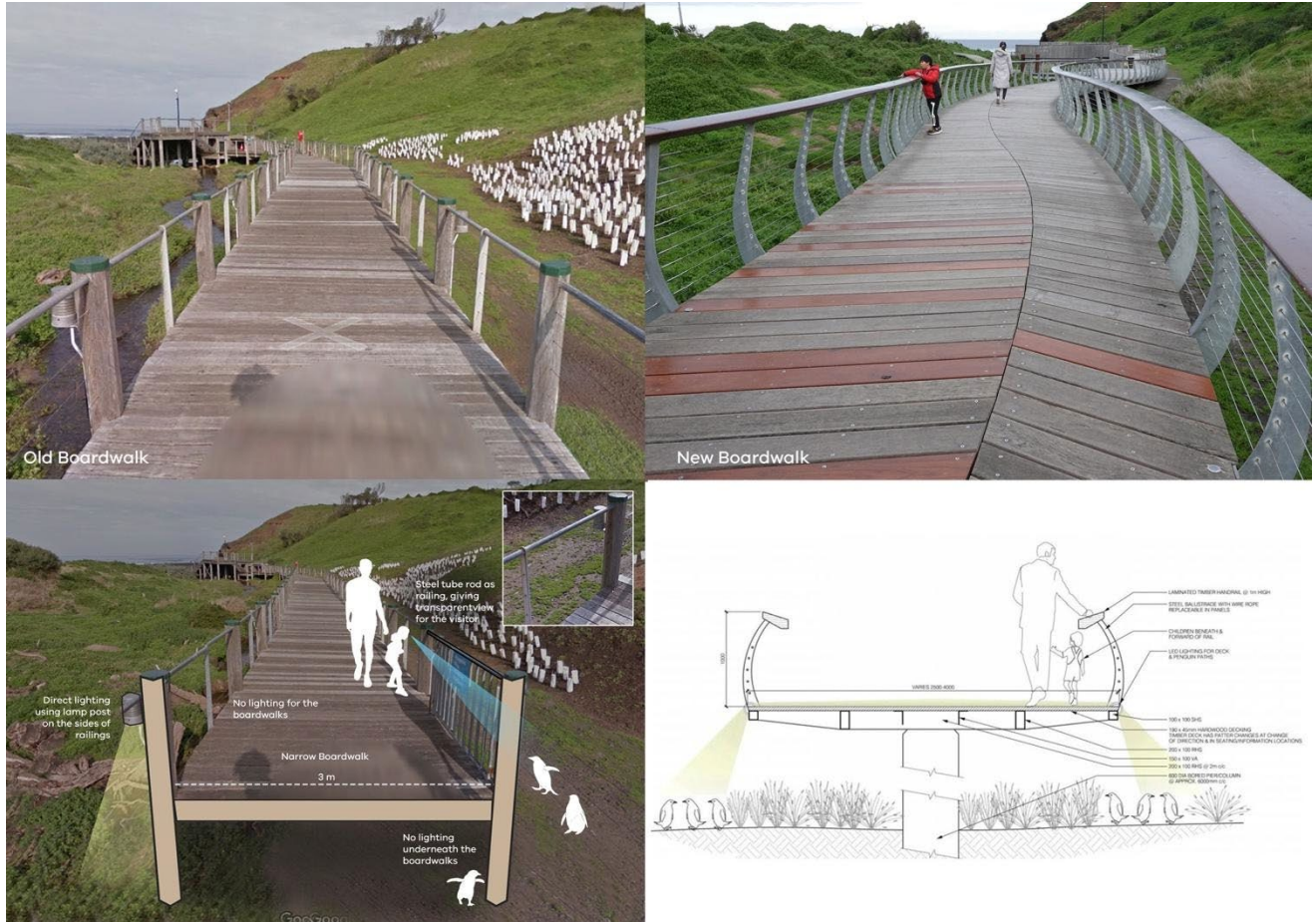


Fig. 44 Comparing the old and new boardwalk. The new boardwalk, with a single concrete pylon support, minimizes its impact on the ground while enhancing viewing transparency. The boardwalk is shaped to fit organic landform, sitting lower in landscape and is responsive to the dunes. The sinuous boardwalk plan enables improved sightlines for visitors to the penguins (on their walk back from viewing the penguin’s beach crossing), lessening the need to look over or past someone. We observed that this allows for an immersive viewing experience and viewing all along the boardwalk, up to the platform, compared to the previous configuration. In detail, the curved railing and balustrade allow for a more comfortable, versatile multi-age viewing and we witnessed kids crouched under parents in the curve of the balustrade.



Fig. 45 Visitors arrival at the viewing platform at dusk, ready to experience the penguin's parade across the beach. The curvilinear platform and boardwalk are comfortably nudged between Phelan's Bluff, the creek and the dune landscapes. (Image: Sintusingha, July 5, 2023)



Fig. 46 Tourists waiting on the deck and in the bunker for the sun to set and the penguins to parade up the beach (video capture from PINP [2017] YouTube site: <https://www.youtube.com/watch?v=krUj4ZmGoxU&t=5s>)



Fig. 47 The new lighting scheme minimizes the presence of tourists on both the viewing platform and boardwalk. The only light source is recessed along the edges and reflected from under the platform and boardwalk. Tourists are expected to adjust to the darkness, rather than the penguins being illuminated for viewers. (video capture from PINP [2017] YouTube site: <https://www.youtube.com/watch?v=MchECDmC8EY>)



Fig. 48 Eye-level view from the bunker, the closest a visitor can get to the penguins (enabling eye contacts), separated by customized curved glass (video capture from PINP [2017] YouTube site: <https://www.youtube.com/watch?v=krUj4ZmGoxU&t=5s>). Compare this to the similarly intimate viewing experiences of the 1950s in Fig. 7.



Fig. 49 Boardwalk detail and lighting strategy developed for the Penguins Plus. Compared to the previous scheme (Fig 42 and 44), artificial lighting is kept to the minimal (small uplights along the deck) – visually minimizing visitors’ presence as they walk back to the visitor centre and carpark. As can be seen in the bottom-centre image and in more detail in Fig 46 to Fig 48 above, strip lighting is integrated into recesses at the edge of the deck which illuminates the penguin’s trail (bottom-centre, bottom-right image, and beaten track in top-left image). Based on the experience at Penguins Plus, PINP has developed a lighting guideline that, for instance, requires minimal blue wavelength and zero blue spectrum emission. (Image credit: Top images by Sintusingha July 5, 2023; bottom images by Jadida March 4, 2023)

Method:

We compare the before and after sequence by drawing data from two sources at a walking speed of 1.3m/s. For the previous Penguins Plus boardwalk and viewing platform, we found Google Earth’s Streetview retained the previous sequences and derived snapshots at distance

intervals. For the new visitor centre, we utilized our own photo and video (GoPro) documentation on the second visit (July 5, 2013). As photography and video was disallowed after sunset, we extracted YouTube stills from PINP's own website (2023).

Calculations:

$(350 \text{ [new Penguins Plus capacity]} - 200 \text{ [old capacity]}) / 200 \times 100 = 75\%$ increase in visitor capacity.

Sources:

PINP. 2012. *Penguins Plus Upgrade Tender Final*.

<http://www.penguins.org.au/assets/About/PDF-Tenders/Penguins-Plus-Upgrade-Tender-Final-.pdf>

PINP. 2023. *Penguin Parade Activities*. <https://www.penguins.org.au/attractions/penguin-parade/activities/>

Limitations:

- On the night of the visit on July 5 2023, taking photography and video was disallowed after sunset. As a result, we relied on fieldnotes and observation and visual media from other sources to evidence features related to viewing boardwalk and platforms. Experiences from earlier visits (e.g. March 4) suggest that there's flexibility in the application of the rule which was applied to flash photography and video (PINP, 2022, p.28). We observed the difficulties PINP rangers have in enforcing this rule with the large crowd and each equipped with a smart phone and the entrenched experience sharing culture of social media.
- We prepared Go-Pro recorders to document the crowd flow to and from the carpark through the visitor centre and the Penguin Parade. We were not able to do this due to the video ban.
- Our RA who visited on March 4 noted that there were far more people – which was to be expected as it was the end of Summer and the start of Spring, while July 5 of the second visit was right at the middle of winter. There were far more penguins too (Tables 4 and 5) as March is the tail-end of the breeding season.
- ***Increased 'excellent' ratings by visitors by 14%, from 64% before implementation of the new visitor centre (2017) to 78% after (2022), according to ratings in prominent commercial travel forums.***

Background:

Penguin Parade is a world-famous and highly popular nature-based tourist destination and is extensively reviewed in prominent travel forums such as Trip Advisor and Google. The Penguin

Parade has garnered very high rating of 4.5 stars from Trip Advisor (from 4,923 reviews) and 4.4 stars from Google Map (from 8078 reviews) as of August 19, 2023.

Method:

We compared two points in time based on the publicly available data:

- PINP's Annual Report 2016-2017 represents the time before visitor centre site upgrade (completed in 2019). PINP reported that of a total of 3,520 reviews in Trip Advisor, 2,252 (64%) rated the Penguin Parade as 'excellent' (PINP, 2017, p.19).
- In August 2023, the PINP team released survey results from May, June, July 2022 to us, which represents the time after the visitor centre site upgrade. PINP's survey were done in-house on various PINP attractions around Philip Island and, crucially, on collated responses from prominent travel forum, TripAdvisor and Google:
 - o In May 2022, 41 out of 49 respondents rated Penguin Parade 5 stars.
 - o In June 2022, 60 out of 76 respondents rated Penguin Parade 5 stars.
 - o In May 2022, 50 out of 69 respondents rated Penguin Parade 5 stars.

Calculations:

We tallied the numbers for the 3 months in mid-2022:

$(41+60+50 \text{ 5-star ratings}) / (49+76+69 \text{ respondents}) \text{ or } 151/194 \times 100 = \sim 77.84\%$

$\sim 77.84\%$ (May, June, July 2022 TripAdvisor + Google ratings) - 64% (2017 accumulated TripAdvisor ratings) = 13.84% increase in 'excellent' rating.

Sources:

Trip Advisor. 2023. *Phillip Island Nature Parks – Penguin Parade*.

https://www.tripadvisor.com/Attraction_Review-g6694217-d544747-Reviews-Phillip_Island_Nature_Parks_Penguin_Parade-Summerlands_Phillip_Island_Victoria.html

Google Maps. 2023. *Penguin Parade*. [https://www.google.com/maps/@-](https://www.google.com/maps/@-38.5096051,145.1486657,2a,75y,135.62h,74.77t/data=!3m6!1e1!3m4!1sjCxqL5tBijeobixhIIBoNA!2e0!7i13312!8i6656?entry=ttu)

[38.5096051,145.1486657,2a,75y,135.62h,74.77t/data=!3m6!1e1!3m4!1sjCxqL5tBijeobixhIIBoNA!2e0!7i13312!8i6656?entry=ttu](https://www.google.com/maps/@-38.5096051,145.1486657,2a,75y,135.62h,74.77t/data=!3m6!1e1!3m4!1sjCxqL5tBijeobixhIIBoNA!2e0!7i13312!8i6656?entry=ttu)

Limitations:

- The data for 2017 is from Trip Advisor's accumulation of reviews (at the time PINP extracted for its annual reporting), while for 2022, PINP combined TripAdvisor and Google respondents for a specific period of 3 months (May to July). Nonetheless, the data represents clear improvements from the accumulated average.

Economic Benefits

- ***Projected to perform better economically by an estimated \$15.3 million AUD by 2040 as compared to the 'base case' of continued operation of previous visitor centre.***

Background:

The economic benefit is extracted from PINP's Phillip Island Penguin Peninsula Business Case Addendum (2015) that compares the 'Base Case', to retain and renovate the old visitor centre, to 'Option 3', building a new visitor centre, car park and landscaping, developing on Tract's design concept in the master plan (but not upgrading boardwalks, viewing platforms and adding new nature experience trails). A summary was provided in p.10 of the document:

'A summary of the financial analysis in 2016/17 present value terms (for the period 2016/17 to 2040/41) is presented in the next table. Key points are as follows:

- From a capital cost perspective, Option 3 is the most expensive option (\$56.9m)
- Option 3 results in increases in wages and non-wage costs relative to the base case, in line with visitor growth
- Option 3 results in lower maintenance costs (\$1.8m) when compared to the Base Case (\$12.8m)
- From a revenue perspective, Option 3 generates an additional \$113.8m from visitor growth and increased yields in cumulative present value terms
- Ignoring capital costs and contingencies Option 3 is \$72.2m better than the Base Case
- Overall (including capital costs), Option 3 is \$15.3m better than the Base Case from a financial perspective' (PINP, 2015, p.10)

According to PINP Business Case Addendum (2015, p.15), 'Option 3' which is to build the new visitor centre and car park facilities, will contribute to regional development through attracting more visitors. By 2040, implementing Option 3 is expected to attract 2.5 million more visitors (and longer lengths of stay) than the 'base case' of continued operation of the old visitor centre (and the significant urgent maintenance that this incurs). The construction of the visitor centre site also delivers economic benefits through employment and the procuring of local materials in compliance with the Victorian Industry Participation Policy (VIPP) Plan which requires project bidders to delivery of '89% local content' for the project. According to the project acquittal document 89.4% local content was achieved. Crucially, Penguin Parade was able to operate throughout the construction period as the new visitor centre was re-sited based on Tract's master plan recommendation. The Victorian Government contributed AUD48.2 million while PINP contributed AUD10million towards the costs of the delivering the new visitor centre facilities.

Method:

Literature review and desktop analyses of PINP documents and data. These are then triangulated through correspondence with the PINP contacts.

Sources:

Ernst & Young. 2015. Phillip Island Penguin Peninsula Business Case Addendum (October 7, 2015).

Limitations:

- These are based on projections made in 2015 for visitor numbers in 2040 and could have not accounted for the COVID-19 pandemic and the resultant poor economy.