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# MITIGATION AND MONITORING PLAN FOR 1412 LISBON LANE, PEBBLE BEACH, CA

## ABSTRACT

A mitigation and monitoring plan to offset the impacts to Monterey Pine woodland and *Piperia yadonii* plants resulting from the construction of a single-family residence and appurtenant development at 1412 Lisbon Lane, Pebble Beach California. Revised 2/08/2017

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## Mitigation and Monitoring Plan

### 1.0 Summary

Mr. Werner Nase has proposed to construct a 5656 square foot single family residence at Lisbon Lane in Pebble Beach California. The property is within the developed neighborhood of Pebble Beach and is surrounded on all sides by development and Lisbon lane. There is no open space interface between the Nase property and undeveloped property. The project includes grading, removal of 46 Pine trees<sup>1</sup> of varying age and health and construction of the residence with attached 3 car garage and driveway and other hardscape features totaling 9449 square feet. The project site encompasses just under one acre (43,456 square feet) of mostly disturbed Monterey Pine woodland. Within the Nase property and a section of Pebble Beach right-of-way along the southern side of Lisbon Lane are 5 individual separate areas of *Piperia yadonii* habitat containing a total of approximately 437 (at minimum<sup>2</sup>) individual *Piperia* plants. This is a federally listed Endangered species, State Rare plant rank 1B.1 (Rare, threatened, or endangered in California and elsewhere .1: Seriously endangered in California). The development of the project will significantly impact the population with direct impacts to plants in the development footprint and indirect impacts to the *Piperia* and Monterey pine woodland habitat.

The overall population of *Piperia yadonii* extends from the Pebble beach right-of-way frontage directly adjacent to Lisbon lane, into the very back of the proposed construction footprint. In February of 2017 I counted at least 437 individual plants of *Piperia* with the clear majority of them within the right-of-way or just inside the north edge of the Nase property. 59 of those are within the actual house footprint. The *Piperia* population footprint is somewhat shaped like a capital T with the top of the T running east to west along the frontage of Lisbon lane and the post of the T running south through the middle of the property through to the SE corner of the proposed house footprint. This poses a few issues with mitigation. Mr. Nase and I have reviewed the potential mitigation possibilities; in order of magnitude they are:

- 1.Total avoidance - Redesign project to totally avoid all plants. Not possible unless project completely changed to a much smaller house and driveway and development footprint is moved to Southern edge of lot. Long term indirect impacts of development and surrounding neighborhood would likely still cause decline of population.
2. Large percentage avoidance and mitigate by transplanting plants from building footprint to frontage of property and Pebble Beach right-of-way, maintain and monitor for success for 5 years. Long term indirect impacts of development and surrounding neighborhood would likely still cause decline of population.
3. Proceeding with the development plan as is, mitigating for *Piperia yadonii* impacts offsite in one of multiple receiver site possibilities; transplanting all known plants to chosen receiver site in Del Monte forest, maintain and monitor for success for 5 years. Mitigate for loss of Pine trees and pine woodland by replanting on Lisbon lane site.

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<sup>1</sup> See Frank Ono *Tree Resource Assessment Management Plan December 2015*

<sup>2</sup> As of February 7, 2017, 437 individual plants (newly emerged single or double leaf) have been flagged on the project site. This is likely fewer than what the total, below ground tuber population is on site.

After discussions with Members of the Del Monte Forest conservancy, the Del Monte Forest Open Space Advisory Committee, The Pebble Beach company and Monterey County Resource Management Agency, the decision was made to mitigate for the impacts to the Lisbon Lane site by transplanting all the known *Piperia yadonii* plants from the Lisbon lane property to a receiver site approximately 6/10ths (.6) of a mile NE within one of the open space areas owned by the Pebble Beach company and applying additional replanting and enhancement measures on the Lisbon lane property.

The measures are summarized in this *Mitigation, and Monitoring Plan* together with success criteria and monitoring protocols to ensure that all preservation, restoration and habitat enhancement goals are met.

All restoration and habitat enhancement will take place within the Nase property impacted by the project on Lisbon Lane and a small 2500 square foot (+/-) receiver site in area H of the pebble beach company . MMP objectives include: 1) restoration and or enhancement of approximately 21,600 Square feet of Monterey Pine woodland in the east end of the Nase property to mitigate for the vegetation that will be permanently lost due to construction; 2) 1:1 replacement of Monterey Pine trees that will be removed by the project; 3) translocation of the approximately 437 *Piperia yadonii* plants from the Nase property and Pebble Beach right-of-way frontage of the Nase property to a 90' by 30' area within area H in the preservation property on Pebble Beach company land along Spruance road .6 mile NE of the Nase property. 4) Maintain population quantity and manage for population increase by sexual reproduction or reduction in nonnative competition in 2700 square foot receiver site.

## 2.0 Purpose

This *Mitigation and Monitoring Plan* serves as an appendix to the *Nase Property biological survey of November 30 2015* and subsequent *Piperia survey letter of March 14, 2016* and provides restoration and habitat enhancement techniques to minimize and mitigate known and potential impacts to sensitive biological resources resulting from the construction project. Through implementation of the MMP, potential impacts to biological resources would be reduced to less than significant levels.

Specific project impacts addressed in this plan include: 1) permanent loss of approximately 9500 square feet of Monterey Pine forest; 2) including removal of 46 Monterey pines (*Pinus radiata*); 3) removal by transplant, of approximately 437 individual plants of Yadon's rein orchid (*Piperia yadonii*).





Proposed minimization or mitigation measures for each impact are summarized in Table 1 below. Table 1. Impacts addressed in the RMMP and proposed minimization or mitigation measures.

Impact	Proposed Minimization or Mitigation Measure(s)
Permanent loss of approximately 10800 square feet (9500 square feet of final surface area with 1300 sq. feet of additional impact zone) Monterey Pine forest.	Enhancement, through weed eradication and replacement plantings of native species typical of the Monterey Pine forest, of 21,600 square feet of Monterey Pine forest on the east portion of the Nase property.
Removal of 46 Monterey pines ( <i>Pinus radiata</i> )	Replacement at rate of 1:1 in Landscape plan. See Landscape Plan Sheet L-5 and Title, Hall Landscape Design.
Removal by transplant, of approximately 437 individual plants of Yadon's rein orchid ( <i>Piperia yadonii</i> )	Transplant 437 live tubers of <i>Piperia yadonii</i> from project impact area into receiver site along Spruance road in area H of Pebble Beach Company preservation property, in early Spring after foliage of current season's growth has emerged but before flowering. Monitor for transplant success, seedling recruitment, and population size for 5 years following transplant. <i>Piperia</i> plants do not reliably sprout new foliage and/or flower stalks every year. 5 years should be sufficient to demonstrate survival of the transplants.



### 3.0 Responsible Parties

The project proponent (Werner Nase) shall, in cooperation with the Pebble Beach Company<sup>3</sup>, be responsible for ensuring completion of all required transplanting, maintenance, and monitoring. In addition, the project proponent shall submit copies of the annual monitoring report to the County of Monterey, Resource Management Agency, Planning Department, California Department of Fish and Game, the U.S. Fish and Wildlife Service and Pebble Beach Company

All transplanting and maintenance shall be performed under the direction of an approved biologist familiar with the identification and life history of *Piperia yadonii* (henceforth referred to as the Project Biologist). Enhancement of areas on the Nase property shall be conducted by a Restoration ecologist or Landscaper familiar with and experienced in native plant restoration and horticulture. (henceforth referred to as the Landscape Contractor) The Landscape Contractor shall be responsible for conducting all site preparation, planting, and maintenance per the details and specifications provided herein.

A qualified biologist (from the Monterey County list of approved consulting biologists) shall conduct all monitoring and preparation of annual monitoring reports.

### 4.0 Goals of MMP

RMMP goals are listed below per the areas to which they apply.

#### *Monterey Pine forest enhancement/ Restoration Site*

- 1) Eradicate majority of non-native grasses, weeds and introduced landscape plants, from eastern portion of Nase property.
- 2) Restore 19000 square foot area on east portion of Nase property using the dominant native species present on project site.
- 2) Replace all trees removed during construction.
- 3) Prevent invasive non-native plant species from colonizing soil disturbed during construction.
- 4) Maintain Native plant habitat with less than 10% nonnative species over course of monitoring period

#### *Piperia receiver/preservation Site*

- 1) Successfully transplant at least 437 *Piperia yadonii* tubers from the Nase property and Pebble Beach right of way into receiver site, avoiding any disruption to successful seed production.

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<sup>3</sup> A memorandum of understanding and appropriate legal documentation of liability and shared responsibilities between Mr. Nase and the Pebble Beach Company will be prepared and signed before any of these activities take place



2) Restore 2700 Square feet of Monterey Pine woodland by removing and preventing establishment of new, or reestablishment of nonnative invasive weeds within the receiver site

3) Maintain Native Plant habitat with less than 10% nonnative species over course of monitoring period.

## 5.0 Proposed Restoration and Mitigation Sites

### 5.1 Lisbon Lane Restoration Site

#### 5.1.1 Location, Size, and Status of Restoration Site.

One continuous strip of land running north to south along the east side of the Nase property and fronted on the North by the Pebble Beach right of way along Lisbon Lane and on the South by the Nase Property line and corresponding fence line with the neighboring property to the south, will be restored to Monterey Pine woodland. This strip of land is approximately 21,600 square feet running approximately 240 feet from North end to South end and 90 feet from east to west, between the proposed house and the eastern neighboring property. The site is currently occupied by a mixture of widely varying sized Monterey pine and Coast live oak trees, occasional native Shrubs such as Evergreen huckleberry and a dense understory of annual weedy grasses such as Rattlesnake grass, Ripgut brome, foxtail chess and Foxtail barley interspersed with introduced landscape plants like *Amaryllis belladonna* and *Epipactis helleborine*.

This area has been managed lightly over the years, primarily for fire fuel management. It appears it has also served as the depository for landscape clippings and waste from neighboring properties, hence the nonnative species introductions. Nonnative eradication and invasive weed management will be important



activities pre and post planting to ensure success of the native species.

This photo shows the proposed restoration area at the East end of the Nase property in November 2015 at the end of 4 years of severe drought.



## 5.2 Spruance Road *Piperia yadonii* Receiver Site

### 5.2.1 Location, Size, and Status of *Piperia yadonii* Receiver site

The 2700 square foot receiver site is on the West side of Spruance road (a dirt road used for Fire safety and special transportation access for large Pebble Beach events) approximately 2/10ths of a mile north of its intersection with Ronda Road. The area is within mature Monterey pine forest with a mixture of smaller trees and shrubs including, Coast live oak, Toyon, Poison oak, and nonnative *Acacia* sp. and *Genista monspessulana* with little to no herbaceous understory. Previous to translocating the *Piperia* tubers from the Nase property to this location it will be prepared by removing the entire *Acacia* plants as well the *Genista* and the fallen oak tree seen in the photo below. Just east of this location, on the other side of Spruance road is a population of *Piperia yadonii* that will be used as a reference population to compare with the translocated plants to determine expected foliage emergence and flowering and reproduction in each year of the monitoring of the translocated plants.



## 5.3 Monterey Pine Planting Site (locations on Lisbon Lane property other than the Eastern restoration area)

### 5.3.1 Location, Size, and Status of Monterey Pine Planting Sites

Monterey pine replacement is incorporated into the landscape planting plan (Hall Landscape Design Sheet L-5) throughout the approximately 1 acre project site. To the greatest degree feasible, all trees used for replacement trees will be grown from seed collected on the project site or within the Del Monte forest. As Monterey Pines are presently scattered over much of the project area in sizes varying from seedlings to over 40 feet tall, it is apparent that conditions are suitable for establishing new container grown trees throughout.

## 6.0 Implementation Plan

## 6.1 Planting Stock

The Landscape Contractor shall be responsible for procuring all container stock and ensuring that all plant materials specified as site specific are produced from site-specific materials (seed, divisions or cuttings). All container stock shall be healthy, pest-, and disease-free. Root-bound trees shall be rejected. The Landscape Contractor shall also verify that plant materials match the genus, species, and size specified in the planting list for each area. If a specified container type is unavailable, the Landscape Contractor may substitute another container type, provided the substituted container is close to the original in volume and depth. \*It is critical that the project proponent and or owner identify a nursery to begin collecting and growing the specified plants as soon as possible to ensure availability for the eventual Landscape contractor.

The number of plants required for the restoration site assumes that roots of all existing native trees and shrubs in this area will remain intact after weed eradication efforts. Spacing of new plants will be done with existing tree canopy, root competition and ultimate mature sizes of plants in mind. An average spacing of approximately 4 feet on center will be applied to all plant species. The Landscape Contractor may adjust quantities based on observed site conditions after all construction and weed control is finished. A list of all plant materials required for the restoration area is provided below in Table 2.

Table 2: Plants for Restoration/Enhancement and Preservation Areas

Common Name	Scientific Name	Quantity	Size
Restoration area C			
Evergreen huckleberry	<i>Vaccinium ovatum</i>	10	1 gallon container (minimum) or transplant from impact area
Dune goldenrod	<i>Solidago spathulata</i>	30	1 gallon or transplant from impact area
Douglass iris	<i>Iris douglasiana</i>	30	1 gallon or transplant from impact area

Common Name	Scientific Name	Quantity	Size
Creeping snowberry	<i>Symphoricarpos mollis</i>	10	1 gallon or transplant from impact area
Common yarrow	<i>Achillea millefolium</i>	30	Stubby cell
Sticky monkeyflower	<i>Mimulus aurantiacus</i>	20	stubby cell
Deer weed	<i>Acmispon glaber</i>	20	stubby cell
Monterey Pine	<i>Pinus radiata</i>	45	5 gallon
Transplants of Yadon's rein orchid to preservation area H in Del Monte Forest			
Yadon's rein orchid	<i>Piperia yadonii</i>	437 (approximate +/-)	In soil wedges

Container sizes referenced:

Stubby cell = ray leach cone-tainer RC7 1.5" diameter by 5.5" deep bullet shaped tube

1 gallon = 6.5" diameter by 7.5" deep

## 6.2 Planting and Transplanting Schedule

All planting for the restoration area shall begin after initial weed control efforts have been completed. Planting shall begin shortly after rains have saturated the soil to at least 8" depth and more rain is expected - typically December 1<sup>st</sup>- January 15<sup>th</sup>. Planting should be completed by April 15.

If permitting and construction schedules prevent implementation of the planting plan during the December to April period, supplemental watering for establishment of the native species will be required.

Transplanting of Yadon's rein orchid from within the project impact area on Lisbon Lane into the preservation area receiver site on Spruance Road will take place between October 15 and March 15. This allows for transplant to occur while all tubers are dormant up to the point when the majority of tubers have sent up vegetative shoots but before flower stalks appear.

Even if permitting and construction schedules prevent implementation of the transplanting plan during the October to March period, to avoid disrupting seed production, the transplant process will be restricted to that period in which the plants are dormant, post flower and seed production up until the first flowering stalks are observed to be rising out of the foliage of known *Piperia* plants on the Lisbon Lane site. A qualified Biologist on the Monterey County list of approved consulting Biologists will monitor the population up until the date that the project is approved to proceed, then confer with USFWS and Pebble Beach company biologists to evaluate the status of the plants and whether it is feasible to commence

transplantation efforts. During this monitoring period, all plants sending up new foliage will be documented and marked with flags other than the orange color used during the initial monitoring in Spring 2016. This will assist in determining the size of each patch for the tree spade operator and simplify the transplant process, if it becomes necessary to do it in the fall of 2017 by marking every foliage producing tuber even after all above ground growth has withered and senesced. Based on the monitoring, the project biologist will determine when the transplant will occur and how much area will be scooped out and transferred to the Spruance road receiver site. If, at the point the project is approved to proceed, plants in the Lisbon Lane property are observed to be sending up flowering stalks, <sup>4</sup>the project will be delayed until plants have gone dormant in the fall of 2017.

### 6.3 Site Preparation

The Monterey Pine restoration/enhancement area on the Nase property shall be mowed or cut with weed eater to 2" or less prior to planting. After the rainy season has begun and annual weeds have sprouted, the entire area will be sprayed with a glyphosate based herbicide (Roundup or equivalent). No native shrubs or trees are to be sprayed and extreme care shall be taken to avoid overspray on to existing natives and plants on neighboring property. Once first application has taken effect, if re-growth of nonnative annuals or perennials is observed, these plants should get a second application of the herbicide spot sprayed as needed. Every effort to avoid additional disturbance of the soil other than digging holes for new plants shall be made.

The *Piperia* Receiver site in the preservation area H will require little preparation aside from the removal of large Acacia plants and a dead oak tree as well as 3-5" of leaf litter from Pines and Acacias on the site. The site for the transplanted *Piperia* was selected based on similarities to the area they will be transplanted from. The Acacia trees have allelopathically limited the growth of understory plants for an extended period. Removal of the Acacia trees (roots and all) and the accumulated leaf litter will improve conditions for native understory plants to recolonize this area. After the Acacia and oak trunk have been removed, a tree spade attached to a tractor will be used to excavate a hole at the chosen receiver site. The Tractor will then go to the Nase property and begin taking "wedges" of *Piperia* occupied soil. The tubers of *Piperia* along with all the companion vegetation will be excavated in a wedge of soil by the tree spade and taken to the receiver site where they will be placed into the wedge-shaped excavations prepared for them. The soil excavated from the receiver site and the accumulated leaf litter raked from the site will be disposed of in another location as worked out with Pebble Beach company.

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<sup>4</sup> It may be possible to move some of the Lisbon lane population even after some plants begin flowering, but this decision will be made in consultation with USFWS staff. In 2016, plants in the eastern portion had flowered and senesced by late July and some plants in the Western portion had not yet put up flowering stalks until September.



## 6.4 Planting Methods

### 6.4.1 Lisbon Lane Restoration Site

Containerized restoration plants shall be installed per the 8' average minimum spacing and numbers provided in Table 2. The locations of planting areas are not specified now and are open to the discretion of the Landscape contractor in coordination with the project Biologist, based on existing shrubs and trees and results of weed eradication activities. Container stock shall be planted with the minimum amount of soil disturbance possible to ensure the least amount of exposure of old weed seeds in the soil. Due to the loose sandy conditions, holes should be excavated with narrow trench shovels or tools designed for planting stubby cell leach tubes. Holes just deep enough for the container size shall be excavated and soil temporarily "stored" in a bucket to prevent spreading onto undisturbed areas. Plants should be placed into holes with the top of the root ball flush with the surrounding soil level and carefully firmed into place with the excavated soil then gently watered in.

6.4.2 Transplanted perennials and shrubs shall be prepared for transplant by carefully pruning back top growth (50% or less) and excavating around the root system to free up the entire root mass. Receiver sites shall be prepared ahead of time with holes dug wide and deep enough to hold the entire root system and well-watered to hydrate the surrounding soil. Plants shall be removed from the impact area and transplanted to the receiver site as soon as physically possible. Plants should be placed so that the root crown sits at the same height in relation to surrounding soil as it did in its original location. Excavated soil is then replaced around the plant and it should be thoroughly soaked to settle the soil around the roots.

All plants (from containers or transplant) shall be mulched with 3" of weed-free mulch (e.g. shredded bark or coconut fiber) in a 4-6" ring around the plant. Mulch shall be pulled back an inch from the base of plants to prevent rot. All plants shall be watered well after planting.

### 6.4.3 Spruance Road *Piperia yadonii* Receiver Site

Transplanted *Piperia* tubers will *not* be individually excavated by hand. *Piperia* plants will be scooped up with soil intact and carried from the donor site to the receiver site inside the tree spade. All receiver sites shall be identified and prepared before the *Piperia* plant "Wedges" are excavated. Tubers shall be transplanted from the donor to the receiver sites as soon as physically possible after being scooped up, and placed in excavated holes in the same position and at the same depth as was removed from the donor site. Each soil wedge location will be photographed, flagged, numbered and all visible *Piperia* plants mapped using a Global positioning system (GPS) device to aid future monitoring.

Until ground breaking for construction of the single-family residence occurs, the Lisbon Lane property will continue to be monitored for *Piperia* foliage, and plants documented will be flagged and transplanted to the Spruance road receiver site at the appropriate time.

During initial groundbreaking activities in the proposed driveway, garage, house and front fence areas, the project biologist shall be on site to monitor and screen samples of soil to search for additional *Piperia*

tubers that may not have produced foliage or flower and still be present after the main transplant effort has concluded. Found tubers will be documented, photographed and transplanted into the receiver site within a soil wedge previously translocated from the Lisbon lane property.

6.4.4 Seed sowing<sup>5</sup> of *Piperia yadonii* shall be done by hand into open spaces between the translocated soil wedges in the preservation area. The receiver area shall be lightly raked with a bow rake or metal tined leaf rake to remove leaf litter and create rough areas for the seed to settle in. Light tamping to maximize seed contact with soil can be achieved by walking back and forth over the seeded area. No watering is necessary, as germination timing and establishment will be dependent upon natural rainfall.

## 7.0 Maintenance During Monitoring Period

### 7.1 Maintenance Activities

#### Watering

Transplanted and container stock at the Lisbon Lane property and transplants at the Spruance road preservation receiver site shall be watered by hand using a water truck or on site irrigation connection, if low rainfall conditions threaten plant survival between the winter planting date and June 1<sup>st</sup>. Plants are not expected to require summer water provided all container stock is installed prior to March 15, planted per specifications, and adequately watered (by hand if necessary) through June 1<sup>st</sup>. However, it is the responsibility of the Landscape Contractor to ensure the plants' survival. Therefore, it is recommended that the Landscape Contractor monitor plant performance during spring/summer weed control visits and hand water once every 2 weeks through the first summer *if necessary*. All watering may cease after the start of winter rains the year after planting.

#### Weed Control

Weed control may be the single most important element of establishing a healthy restoration of habitat and protecting the long-term viability of a *Piperia yadonii* population. The goals of weed control on site are to: 1) prevent the spread of invasive non-native species to areas disturbed during



<sup>5</sup> Depending on timing of project commencement, *Piperia yadonii* seed, if available, may be collected from plants on the Nase property and sown at the receiver site after the translocation occurs.

construction and transplantation; 2) reduce or eliminate weed competition with planted stock and translocated tubers; and 3) eradicate existing invasive weeds from restoration and preservation sites

Following planting, the restoration/enhancement and preservation areas shall be weeded on a regular basis (January, April, July and October) for at least five years, or until success criteria are met. Weeding should be conducted under the direction of a qualified biologist and laborers shall be trained in the recognition of both the nonnative species to be removed as well as the native species to protect and leave in place. (Photo at bottom of previous page shows mix of native and nonnative species around *Piperia* foliage) Weeding efforts shall target annual grasses, introduced nonnative landscape plants, and *Genista* and *Acacia* in the restoration/enhancement site on the Lisbon lane property, and include any and all non-native species in the preservation site along Spruance road

## 7.2 Maintenance Schedule

### Lisbon Lane Restoration Site

The maintenance period shall begin after planting is completed, and continue for at least 5 years until success criteria have been met. Maintenance activities will include weeding the restoration/enhancement and preservation receiver site as well as watering at both sites as needed. Weeding shall be performed at least three times each year between January and July and again in Autumn as necessary. Container stock shall be watered by hand if low rainfall conditions threaten plant survival between the winter planting date and June 1<sup>st</sup>. The later the planting date occurs, the later the supplemental watering should continue. Due to the small container size of planted stock, late summer and fall watering should not be necessary. However, plant performance should be monitored by the Landscape Contractor during spring/summer weed control visits and *if necessary*, plants watered once a month until the onset of the next rainy season..

### Spruance Road *Piperia* Yadonii Receiver Site

Translocated *Piperia* plants should be watered by hand (Using a water truck or carried in buckets) immediately after the translocation process has concluded and repeated no more than two weeks apart or two weeks after the most recent rainfall if rainfall occurs less than two weeks after translocation until June 1. Timing of the transplant will also affect the watering regime here. The later the transplant the later into the year the supplemental watering should occur. Watering should be done sparingly in any case as early dormancy from drought stress is preferable to rotting the tubers from too much water.

## 8.0 Monitoring Plan

Monitoring of both the restoration/enhancement site and the preservation receiver site will occur 4 times a year for 5 full years after completion of the project.

## 8.1 Intermediate Performance Standards and Final Success Criteria

Intermediate performance standards for Years 1 and 2 and final success criteria for Year 5 are listed below by area.

### Lisbon Lane Restoration Site

#### Intermediate performance standards:

- 1) 90% survival of all container stock combined in fall of Year 1 (the first fall after planting)
- 2) Total non-native species cover 15% or less in spring of Year 1; 10% or less in spring of Year 2 and thereafter

#### Final success criteria:

- 1) Total percent of vegetative cover 90% native species or greater in spring of Year 5
- 2) Total non-native species cover 10% or less in spring of Year 5

### Spruance Road *Piperia yadonii* Receiver Site

#### Intermediate performance standards:

- 1) Total number of *Piperia* tubers sprouting foliage within the translocation receiver area, first year equal to 25% of original transplant number.  
Total number of *Piperia* tubers sprouting foliage within the translocation receiver area, years two and three equal to 50% of original transplant number.  
Total number of *Piperia* tubers sprouting foliage within the translocation receiver area, year 4 equal to 75% of original transplant number.
- 2) total vegetative cover of nonnative species within translocation receiver site 10% or less in year one and 5% or less in years 2-4

#### Final success criterion:

Total number of *Piperia* tubers within the translocation receiver site sprouting foliage in fifth year equal to 100% of original transplanted number and total area (square feet) of receiver site occupied by *Piperia* plants increased from original transplant area.

Plants existing within the preservation area, directly south of the receiver site on the opposite side of Spruance road will be monitored each of the next 5 years to use as a control baseline for determining conditions for foliage growth and blooming in each year and to provide data regarding the stability of the overall *Piperia* population within the Preservation area. A four-year percentage average (of plants counted, mapped and monitored starting in winter 2017) of the total plants putting up foliage and flower will be used as an indicator of success (or failure) in comparison to the number of plants putting up foliage and flower in the receiver site in a specific year. It is expected that the success rate (foliage and flower production) in the Receiver site will dip in the first one to two years as compared to the control site and rebound to similar rates in the 4<sup>th</sup> and 5<sup>th</sup> years. If after 4 years of monitoring, the number of plants putting up foliage growth is below 437, or below the average percentage in the control side, monitoring will be extended for up to two additional years to account for variables in weather patterns, transplant shock,



disease or mortality due to herbivory. If the 5th year count is below 437 plants putting up new foliage, the project proponent will consult with the County of Monterey and the US Fish and wildlife service to determine an appropriate alternate mitigation such as funding protection of a known population in a nearby area or extended monitoring and reporting to determine reasons for the population decline as well as potential remedial actions beneficial to future *Piperia* management activities.

Monterey Pine Planting Sites as noted on Hall Landscape Design landscape planting plan sheet L-5

Intermediate performance standard:

- 1) 100% survival of planted pines in fall of Years 1 and 2<sup>6</sup>

Final success criterion:

- 1) 100% survival of planted pines in fall of Year 5

### 8.2 *Monitoring Methods*

All monitoring of the containerized stock and transplanted shrubs and perennials in the restoration/enhancement site and the translocated *Piperia* plants in the preservation receiver site shall be completed by a qualified biologist, from the Monterey County list of consulting biologists. Percent cover monitoring shall be performed in the spring. Percent cover of Annual grasses, Genista, and other nonnative weeds may be visually estimated for each site after searching the entire area thoroughly.

For the restoration/enhancement site, additional required native cover data shall be collected quantitatively. Line transects shall be randomly placed per a stratified sampling design, based on the total area of that site. A total of at least 4 15-ft transects shall be placed across the restoration area. 10 points per transect shall be sampled for total cover by recording all species that occur at each point. Percent cover of native species, non-native species, and bare ground shall then be calculated for each transect. Mean and standard error for each cover class shall then be calculated for all transects combined and compared to performance standards/success criteria.

Survival/mortality shall be determined quantitatively in year one for the restoration/enhancement area. Subsampling is recommended to reduce sampling time. Subsampled individuals should be randomly selected before or immediately following planting. Each plant within the subsample should be well marked for easy relocation during fall monitoring.

### 8.3 *Annual Reports*

In December of each year, the project proponent shall submit annual monitoring reports to the County of Monterey RMA Planning department, U.S. Fish and Wildlife Service, California Department of Fish and

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<sup>6</sup> Ono Tree management plan calls for 100% survival of planted stock. All trees that die will be replaced to meet 100% success.

Wildlife and Pebble Beach Company, for a total of 5 years. The first report shall be submitted in December of the year in which all planting and translocation has been concluded. Monitoring reports shall include methods, results, analysis of results, photo documentation, discussion of results relative to performance standards/success criteria, and recommended remedial measures if necessary.

#### *8.4 Monitoring Schedule*

Monitoring of translocated *Piperia* plants in the receiver site shall occur once a month for the first 6 months after transplant. Annual monitoring for all areas shall be performed in the early spring (March – April) and late summer (August – September) of Years 1, 2, 3, 4 and 5. If final success criteria are met Year 5, all monitoring may cease. If final success criteria are not met Year 5, remedial planting and weed control shall be performed and the site monitored again the following year.

#### *9.0 Completion of Mitigation*

Mitigation shall be considered complete once the Year 5 annual monitoring report has been submitted and all success criteria have been met to the satisfaction of the County of Monterey Planning Department, U.S. Fish and Wildlife Service and California Department of Fish and Wildlife. If the site does not meet final success criteria at the end of the 5-year monitoring period, contingency measures shall be implemented (see below) or success criteria modified with approval of the reviewing agencies listed above. Success criteria shall be waived in the event of high plant mortality due to prolonged drought, or other adverse circumstances beyond the project proponent's control.

#### *10.0 Contingency Measures*

##### *Lisbon Lane Restoration Site*

If the site does not meet final success criteria at the end of 5 years, additional planting and weed control shall be implemented the following winter to meet success criteria. Monitoring shall be repeated in the spring and fall following planting, and an annual report submitted to the agencies (see Section 9.0) in December.

##### *Spruance Road *Piperia yadonii* Receiver Site*

If the Site does not meet final success criteria at the end of 5 years, the project proponent (and/or project biologist) shall consult with US Fish and Wildlife staff on appropriate measures to take based on monitoring results and research that has been conducted on Pebble Beach Company property. Measures may include additional monitoring time, Soil treatments, Seeding in other areas and or increased weed control.

Attachments  
Arborists Tree Plan

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Biological assessment and addendum  
Site plan / with Piperia mapped  
Landscape Plan Sheet L-5