Preliminary Geotechnical Engineering Report

Proposed Gravel Point Development
Beach Loop Road and Face Rock Drive
Bandon, Coos County, Oregon

Coos County Property ID: T28S-R15W-S36
Tax Lots 219, 400, 500, 600, 700, & 1500

February 13, 2024

Prepared for:

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On behalf of:

Bandon Beach Ventures, LLC
c/o Perk Development Group, LLC.

Prepared by:

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Project No. 959-23016-01

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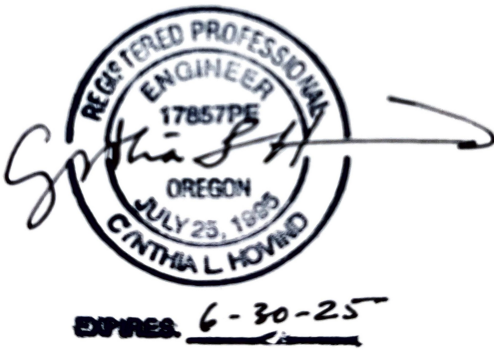

Cynthia L Hovind, PE GE, Senior Geotechnical Engineer

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1.0 INTRODUCTION

As requested, EVREN Northwest, Inc. (ENW) is pleased to present our preliminary geotechnical engineering report summarizing our initial work for the referenced project. Our work included reviewing the Galli Group's October 18 2022 Geotechnical Report, reviewing the February 2024 Gravel Point Development Plan, and providing conclusions on the completeness of the Galli report and recommendations for conducting additional field explorations, revising the geotechnical analyses and recommendations, and preparing an updated geotechnical engineering report. Our work was completed in general accordance with our December 4, 2023 Proposal for Geotechnical Engineering Services.

1.1 Site Description

The referenced property is located south of the City of Bandon, Oregon (see Figure 1). The proposed 23.2-acre development site is almost rectangular in shape and is bound to the north by Face Rock Drive, to the west by residential houses and Beach Loop Road, to the east by undeveloped land, and to the south by residential houses (see Figure 2).

The site is currently undeveloped, and the terrain varies across the site. On the western side, the site is hummocky and undulates with sand dune deposits that are covered in beach grass. The elevations on the west side of the site range from 70 feet above mean sea level (NAVD88) to 110 feet NAVD88. On the eastern side, the site is flat and covered with grass and trees. Elevations range from 70 to 80 feet NAVD88 across the east side. Several wetlands are mapped in lower elevations across the site (see Figure 3).

1.2 Project Description

ENW understands that Bandon Beach Ventures, LLC has proposed to develop the site as Gravel Point. The proposed February 2024 development plans include the Meadow Lodge hotel, the Dune Lodge restaurant, and the associated Meadow Suites and Ridgeline Suites (see Figure 3). Brief descriptions of proposed buildings are presented below:

Proposed Meadow Lodge. The proposed Meadow Lodge hotel is in the central east portion of the site (see Figure 3). The three-story building will include 110 rooms, a bar and breakfast lounge, a health spa, and an underground parking garage. The proposed building footprint is approximately 50,000 square feet. The 75-space garage will be in the basement excavated approximately twelve (12) feet below the first level of the lodge.

Proposed Dune Lodge. The proposed Dune Lodge is situated in the central west portion of the site (see Figure 3). The proposed two-story building includes an upper level with a restaurant and small conference center, and a lower level with a casual dining and drinking area, and a limited 15-space parking garage. The proposed lower level of the building will be excavated into the sand dune and the upper level will be partially recessed into the sand dune. The proposed footprint of the building is 16,000 square feet (see Figure 3).

Proposed Ridgeline Suites. The proposed Ridgeline Suites are situated in the central-north portion of the site (see Figure 3). Each building has a 1,000-square-foot footprint and will be built into the sand dune ridge that runs north to south in that portion of the site. The ground level will be within the dunes and the second level and roof above.

Proposed Meadow Suites. The proposed Meadow Suites will be in the flatter areas of the of the site (see Figure 3). Each unit is a stand-alone, two-story building with a proposed footprint of 1,250 square feet. The proposed foundation will be at grade.

Access Roads and Pedestrian Pathway. The site will be accessed with a combination of roads and walking paths. Access for the center and southern portions will be along new roads, while the northern portion will be accessed by a new scenic walking path.

Landscape Wetland Areas. Several landscaped wetland areas are proposed for the site (see Figure 3).

2.0 The Galli Group Geotechnical Engineering Report

On October 18, 2022, The Galli Group (Galli), of Grants Pass, Oregon, submitted a Geotechnical Design Report based on an earlier concept of the Gravel Point development. The Galli report included a summary of their field and laboratory testing, surface and subsurface conditions, geologic hazards and seismic design parameters, conclusions, and geotechnical recommendations. The preliminary conceptual plans were prepared by DLR Group, of Portland, Oregon and included a new hotel with an underground parking garage, an associated clubhouse, and a pool area in the western half of the property, and individual suites in the eastern half of the property. The proposed development included a network of new roads and pathways snaking through the development.

Since Galli submitted their report, the proposed development plans have changed significantly, as discussed above. ENW's review of the Galli report found that the field and laboratory data remained relevant to the new proposed Gravel Point plans (see Figure 3); however, the geotechnical engineering analyses and recommendations were not relevant, and therefore, ENW recommends that a new geotechnical engineering report be completed to reflect the proposed new development. A summary of our review and recommendations are presented below.

2.1 Field Exploration

ENW's review of the Galli Report found that the following field exploration and soil laboratory data presented in the report were still relevant to the February 2024 plans.

Field Exploration. Galli's field exploration included four (4) drilled borings up to 46.5 feet below the ground surface (bgs), sixteen (16) test pits up to 12 feet bgs, and nine (9) 8-inch-diameter falling-head permeability tests at 3 feet bgs (see Figure 3). The locations of their borings and test pits appear to coincide with the updated proposed Gravel Point development (see Figure 3).

The field data indicated that the entire site was mantled with organic Topsoil and isolated areas of Peat that varied in thickness across the site. In the western half of the site, the soil was loose Sand Dune deposits that ranged between 15 to 30 feet deep. The eastern half of the site, however, the soils were medium dense to dense, weakly cemented Sand of the uplifted Marine Terrace which transitioned into dense gravelly Sand and Sandy Gravel.

Depths to shallow groundwater varied across the site. In the western half, the groundwater was 20 to 24 feet bgs, and in the eastern half, the shallow groundwater was 10 feet bgs. In borings B-3 and B-4, heaving sands were encountered below the shallow groundwater levels. Galli also noted that based on the variation of the soil colors, the shallow groundwater may rise to within two (2) feet bgs.

The permeability tests measured the permeability coefficient of the upper Sand. In the western portion of the site, the Sand permeability ranged from 12 inches per hour (in/hr) to 20.9 in/hr and in the east side, the silty Sand permeability ranged from 0.57 in/hr to 2 in/hr.

Review of the field data indicates that while the information is mostly relevant to the proposed new development, there are data gaps in the north and south of the property. ENW recommends that additional fieldwork be completed at the site to gather the missing data (see Figure 3). The proposed fieldwork includes two (2) test pits in the location of the proposed Meadow Lodge and four (4) Cone Penetrometer Tests (CPT) in the locations of the proposed buildings (see Figure 3). A discussion of the CPT soundings is presented below. ENW will incorporate the results of the additional field data into the updated geotechnical engineering report.

2.2 Soil Laboratory Testing.

Galli conducted laboratory tests on the soil samples collected during the field exploration. The tests included washed sieve and hydrometer analyses, the California Bearing Ratio (CBR) test, the measured unit weight, 1-d consolidation test, direct shear tests, and a Moisture-Density standard Proctor test. ENW will incorporate the relevant soil test results into the updated geotechnical report.

No additional soil laboratory tests are recommended.

2.3 Geologic Hazards and Seismic Design Parameter.

ENW reviewed Galli's description of the site geology, geologic hazards, and seismic design parameters for the site. ENW has the following comments about the different sections:

Site Geology. ENW agrees with the site geology section of the report. ENW will incorporate the site geology section into the updated geotechnical report.

Geologic Hazard. ENW agrees with the conclusions of the Flooding, Landslide Hazard, Expansive Soils, Faulting Ground Rupture, Ground Shaking, and Seismic Ground Amplification. ENW, however, does not agree with the Liquefaction Analyses or the Tsunami and Seiche evaluation of the site.

ENW will reevaluate the Liquefaction potential using the CPT data collected during the additional fieldwork. ENW will incorporate the new analyses into the updated report.

ENW will re-evaluate the Tsunami and Seiche hazard potential for the site. ENW will include the revised data in the updated report.

Site-Specific Ground Motion Hazard Analysis. ENW will review the site-specific ground motion hazard analyses for the project site; and if necessary, ENW will re-evaluate the Site-Specific Ground Motions for the site and include the revised analyses in the updated report.

2.4 Conclusions and Geotechnical Recommendations

ENW's reviewed the Galli conclusion and geotechnical recommendations and found that some of the recommendations were appropriate and relevant to the proposed Gravel Point development. ENW, however, found the following geotechnical recommendations were not relevant to the proposed development and will therefore revise them in the updated report.

Structural Fill Placement and Compaction. Galli recommended using a free-draining granular material with a maximum particle size of 6 inches and specified a compaction rate of 98 percent of a maximum dry density based on a standard Proctor Moisture-Density (ASTM 698).

The 6-inch-minus crushed rock cannot be properly tested in a laboratory or field for compaction, and therefore, this specification is not appropriate.

ENW will revise the Structural Fill for appropriate material and specifications in the updated report.

Site Excavation. Galli assumed that the deep excavation would occur on the west side of the property instead of the east side. The proposed Meadow Lodge is now located on the east side of the property and has a proposed 12-foot-deep excavation. Field data indicates that the shallow groundwater was at 10 feet bgs and that there were heaving sands below.

ENW will re-evaluate the proposed excavation and provide revised recommendations for the excavation, groundwater management, and shoring in the updated report.

Utility Line Recommendations. Galli provided recommendations for the trench excavation, backfill and compaction, bedding, pipe zone material, and general trench backfill. While Galli provided compaction specifications, they only provided specifications for the general trench backfill.

ENW will provide updated recommendations for the utility backfill.

Structural Support Recommendations. Galli's report assumed that the suites would be on the east side of the site and that the large building with underground parking would be on the west side of the property. They recommended the following:

> **Structural Slab Foundation (East)**. Galli recommended structural slab foundation be used to support the suites located on the east side of the property.
>
> **Deep Foundations (West).** Galli recommended several options for deep foundation to support the larger building on the west side of the site. The recommended systems included Pile Foundation, Auger-Cast Pile Foundation, and GeoPiers.

ENW will review these foundation recommendations to see if they are still appropriate for the proposed buildings and their locations on the property.

ENW will provide new foundation recommendations in the updated report.

Lateral Load Resistance. Galli provided lateral load resistance for the proposed foundation members, piles and piers based on the conditions of the east and west sides of the site.

ENW will re-evaluate the lateral load resistance for the appropriate site conditions and foundation types and provide them in the updated report.

Lateral Earth Pressures. Galli provided lateral earth pressures for the proposed retaining walls on the site.

ENW will re-evaluate lateral earth pressures for the new site configuration. The revised lateral earth pressures will be in the updated report.

Foundation and Retaining Wall Drains. Galli provided recommendations for foundation and retaining wall drains based on the original development plan.

ENW will review the foundation and retaining wall drain recommendations and provide the revised recommendation in the report.

Asphalt Pavement. Galli provided recommendations for the proposed access roads through the site. ENW will review the recommendations and evaluate whether they are appropriate for the project. ENW will provide the revised recommendations in the updated report.

2.5 Material Specifications

Galli provided material specifications in their report. ENW will review the material specifications and evaluate them to see if they are appropriate for the project. When appropriate, ENW will provide the revised specifications in the updated report.

2.6 Site Drainage

Galli provided recommendations for site drainage in their report. ENW will review the recommendations and evaluate whether they are appropriate for the project. When appropriate, ENW will provide the revised recommendations in the updated report.

2.7 Erosion Control

Galli provided erosion control recommendations in their report. ENW will review the recommendations and evaluate whether they are appropriate for the project. When appropriate, ENW will provide the revised recommendations in the updated report.

3.0 ENW Conclusions and Recommendations

3.1 Conclusions

ENW reviewed the Galli Geotechnical Design Report and found that the report does not adequately provide geotechnical recommendations for the proposed Gravel Point development. The primary reason that the report was inadequate was because the proposed development plan changed, and the report did not reflect those changes. Therefore, ENW recommends that additional fieldwork be completed at the site and that an updated report be written that reflects the proposed Gravel Point development.

3.2 Recommendations

ENW recommends the following:

Additional Geotechnical Field Investigation. ENW will conduct a geotechnical field investigation for the project. Our investigation will include two (2) test pits in the location of the proposed Meadow Lodge and four (4) CPT soundings in the location of the proposed Ridgeline Suites, Meadow Lodge, Dune Lodge, and Meadow Suites (see Figure 3). We anticipate that the depths of the test pits will be 10 to 12 feet bgs and the CPT soundings will be up to 35 feet bgs or to practical refusal.

The CPT soundings will be conducted in general accordance with ASTM test Method D 5778. The CPTu method determines geotechnical engineering properties of soils and delineating soil stratigraphy. The method consists of pushing an instrumented cone into the ground at a controlled rate. Software records at 5-cm intervals cone tip resistance (qc), sleeve resistance (fs), and dynamic pore water pressure (u2). The tip, sleeve, and pore pressure measurements determine soil behavior types. In addition, seismic shear waves velocities measurement will be taken at 1-meter intervals. The shear waves generated with an auto hammer at the surface and the time to reach the sensors are measured with the computer. The shear wave data determines the stiffness of the in-place soils and the soil classification for the seismic analyses of the site.

Geotechnical Engineering Analyses. ENW will use the updated test pit and CPT data to evaluate the potential for seismic induced liquefaction settlement, allowable bearing capacity, total and differential settlement, retaining wall allowable lateral earth pressures, deep foundation capacities, and shoring.

Geotechnical Engineering Report. ENW will prepare a Geotechnical Engineering Report summarizing the results of the additional fieldwork and engineering analyses. The report will meet the requirements of the 2022 OSSC. A Professional Geotechnical Engineer licensed in the State of Oregon will stamp the report.

The proposed report will summarize the following:

- A general description of the site and a plan map showing the approximate location of the Galli Field Exploration and ENW Test Pit and CPT field exploration.
- Logs of the exploratory Test Pits and CPT, and a description of the general subsurface soil conditions encountered in the borings, including the presence of shrink-swell soils, fill soils, wet soils, or shallow groundwater.
- Summary of Site Geology;
- Summary of Site Geologic Hazards, including Liquefaction and Tsunami Hazards;
- Summary of Site-Specific Ground Motion Hazards;
- Recommendations for Wet Weather/Soil Conditions;
- Recommendations for Site Grading;
- Recommendations for Excavation;
- Recommendations for Structural Fill;
- Recommendations for Shallow Foundations;
- Recommendations for Allowable Bearing Capacity;
- Recommendations for Total and Differential Settlement;
- Recommendations for Liquefaction Induced Settlement;
- Recommendations for Embedment Depths for Shallow Foundations;
- Recommendations for Deep Foundation Support, including Vertical and Lateral Capacities;
- Recommendations for Retaining Wall Lateral Earth Pressures and Surcharges;
- Recommendations for Retaining Wall Backfill and Drainage;

- Recommendations for Shoring;
- Recommendations for Groundwater Control;
- Recommendations for Asphalt Pavement;
- Recommendations for Material Specifications;
- Recommendations for Site Drainage;
- Recommendations for Erosion Control Measures; and
- Recommendations for Review of Documents and Special Inspections during Construction.

Review of Documents and Special Inspections. ENW will review the final documents for the proposed development to ensure that the recommendations provided in our report are incorporated into the design and site grading drawings.

Geotechnical Special Inspections. During construction, ENW will provide Geotechnical Special Inspection for the earthwork and foundation excavation portion of the construction. Our inspections will include, but not limited to, the following:

- Erosion Control Installation;
- Subgrade Conditions for Foundation, Retaining Walls, Parking Lots, and Roadways;
- Installation of Shoring;
- Digging of Deep Excavations;
- Installation of Retaining Wall Backfill and Drainage; and
- A Materials Testing Company (i.e., ACS Testing or Carlson Testing) will conduct Compaction Testing of Structural Fill and AC Compaction Testing.

4.0 LIMITATIONS

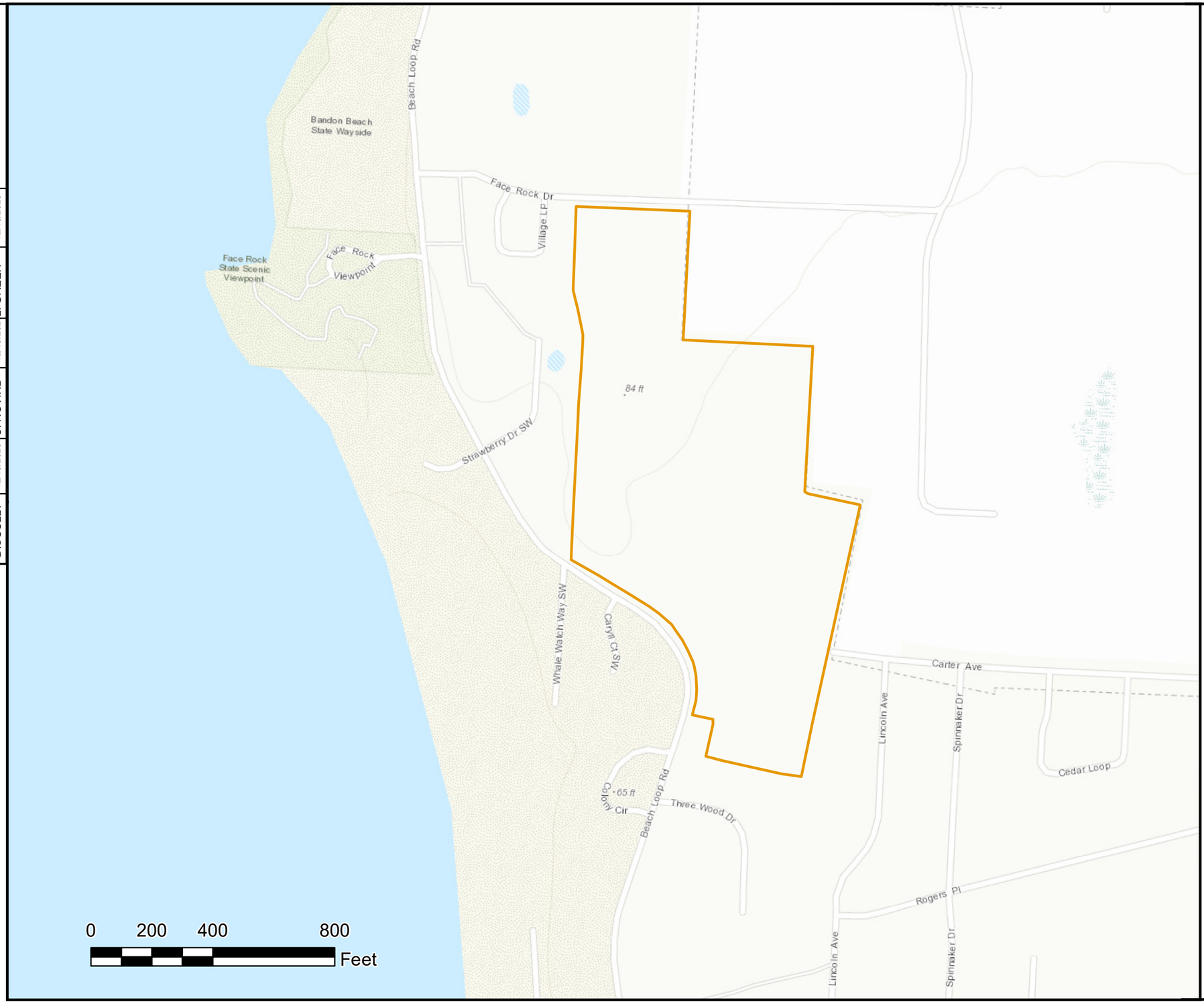
Geotechnical review and special inspections during construction is of paramount importance in engineering practice. The poor performance of many foundations has been attributed to inadequate construction review. On-site grading and earthwork should be observed and, where necessary, tested by a qualified engineering firm to verify if the recommendations in this report were followed. Foundation excavation should also be observed to compare the generalized site conditions assumed in this report with those found on the site at the time of construction. If the site development plans are changed, or if various or undesirable geotechnical conditions are encountered during construction, the geotechnical engineer should be consulted for further recommendations.

This report is issued with the understanding that it is the responsibility of the Client to ensure that the recommendations are incorporated in the plans and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field. Geotechnical engineering is characterized by a certain degree of uncertainty. Professional judgments presented

are based partly on our understanding of the proposed construction and partly on our general experience. Our engineering work and judgments rendered meet current professional standards; no other warranties, either expressed or implied, are made. This report is subject to review and should not be relied upon after a period of 3 years.

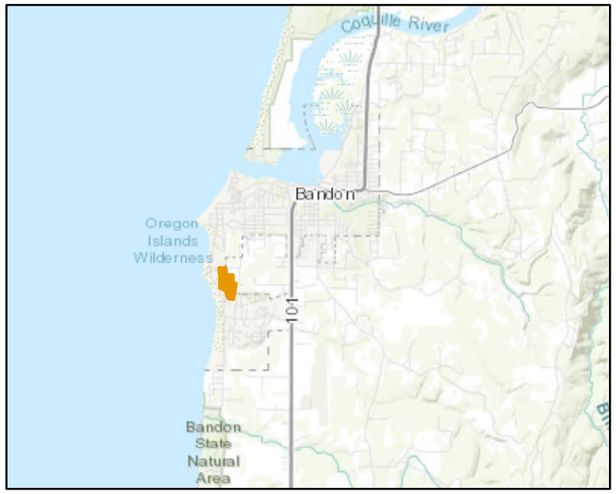
FIGURES

DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
D.SCULLY	12/18/2023	C. HOVIND	12/18/2023	L. GREEN	12/18/2023	959-23016-01



LEGEND:

REFERENCED PROPERTY



NOTES:

1. BASE MAP DEVELOPED BY ESRI.
2. PROPERTY BOUNDARY MAY NOT BE EXACT.
3. ALL BUILDINGS, STREETS, AND FEATURES LOCATIONS ARE APPROXIMATE.
4. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

N

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FIGURE 1
SITE VICINITY MAP

GRAVEL POINT
BEACH LOOP ROAD
BANDON, OREGON

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
D.SCULLY 2/13/2024	C. HOVIND 2/13/2024	L. GREEN 2/13/2024	959-23016-01

LEGEND:

- REFERENCED PROPERTY

LAND CLASSIFICATION

- COASTAL DUNES
- MARINE TERRACE
- WETLANDS

PROPOSED ENW, 2024

- CPT
- TEST PIT

GALLI GROUP, 2022

- BORING
- PERMEABILITY
- TEST PIT

NOTES:

1. BASE MAP DEVELOPED BY ESRI.
2. GALLI GROUP LOCATIONS FROM GEOTECHNICAL DESIGN REPORT 10/18/2022 .
3. ALL BUILDINGS, STREETS, AND FEATURES LOCATIONS ARE APPROXIMATE.
4. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

0 125 250 500 Feet

N

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FIGURE 2
EXISTING SITE MAP

GRAVEL POINT
BEACH LOOP ROAD
BANDON, OREGON

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
D.SCULLY 2/13/2024	C. HOVIND 2/13/2024	L. GREEN 2/13/2024	959-23016-01

LEGEND:

REFERENCED PROPERTY

PROPOSED ENW, 2024

- CPT
- TEST PIT

GALLI GROUP, 2022

- BORING
- PERMEABILITY
- TEST PIT

PROPOSED BUILDING & FOOTPRINT AREA

02	MEADOW SUITES (5) (6,250 SF)
04	RIDGELINE (10) (10,000 SF)
07	MEADOW LODGE (50,000 SF)
09/12	MEADOW SUITES (17) (21,250 SF)
10	DUNE LODGE (16,000 SF)

WETLANDS

01, 05, & 11

NOTES:

1. BASE MAP DEVELOPED BY ESRI.
2. PROPOSED DEVELOPMENT PLAN BY DLR GROUP, JUNE 23, 2023.
3. ALL BUILDINGS, STREETS, AND FEATURES LOCATIONS ARE APPROXIMATE.
4. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

0 125 250 500

Feet

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FIGURE 3
PROPOSED DEVELOPMENT PLAN

GRAVEL POINT
BEACH LOOP ROAD
BANDON, OREGON