

CITY OF FLORENCE
SITE INVESTIGATION REPORT PHASE 2

Premier Contracting Services
Applicant

1/31/
Date

Build SFD on lot 37 skeltrcur
Proposal

18-12-16-41 00700
Map No. Tax Lot

56 Shoreline dr Florence
Street Address

low density/
Zoning District

Overlay District

This investigation was done by:



Signature
Todd Larsen
Name
CONTRACTOR
Title

Florence City Code 10-7-4: Site Investigation

A. Areas Requiring a Site Investigation: Areas identified on the "Hazards Map," "Soils Map," or Resource Inventory are subject to the site investigation procedure contained in site investigation reports by Wilbur E. Ternyik, published by OCZMA. No building permit, conditional use permit or other permit subject to the provisions of this Title may be issued except with affirmative findings that:

- 1. Upon specific examination of the site, the condition identified on the "Hazards Map" or "Soils Map" or supporting inventory documents did not exist on the subject property; or
2. That harmful effects could be mitigated or eliminated through, for example, foundation of structural engineering, setbacks or dedication of protected natural areas.

Site investigation requirements may be waived where specific standards, adequate to eliminate the danger to health, safety and property, have been adopted by the City. This exception would apply to flood-prone areas, which are subject to requirements of the National Flood Insurance Program and other problem areas which may be adequately protected through provisions of the Building Code. (Ord. 669, 5-17-82)

B. Site Preparation Permit Required: A site preparation permit is required for sites identified as subject to a site investigation. A permit will be issued by the Planning Director based on criteria 1 and 2 of 10-7-4-A.

SITE INVESTIGATION – PHASE 2
DEVELOPMENT APPLICATION CHECKLIST

See report, "Beach and Dune Implementation Techniques: Site Investigation Reports," Oregon Coastal Zone Management Association, for details on the following requirements.

A. STATE AND LOCAL LAND USE REGULATIONS

Submit letter from City planning staff and/or engineer certifying that the proposed development site plan conforms with applicable city regulations and plan designations. Letter must indicate approval of conformance with any special code provisions. If an exception to a statewide planning goal or a variance has been

previously approved for the particular locale, substantiate accordingly.

B. IDENTIFIED SET BACK LINE OR DESIGNATIONS

Identify on site plan all established set back lines.

C. IDENTIFIED HAZARDOUS CONDITIONS

1. Map to approximate scale all identified areas of wind erosion, water erosion, and slide activity.
2. Provide written details on extent of hazard: wind erosion, water erosion, slide areas.

D. EXISTING SITE VEGETATION

1. Map all major areas of vegetation and provide lists of dominant species in each area.
2. Provide investigator's assessment of age, condition, and stability of all vegetated areas.
3. Identify on site plan any removal or modification of vegetative cover.
4. Give brief description of vegetative cover on adjoining lands.
5. Identify and describe areas where vegetative cover poses a fire hazard. List species and condition. Propose solution to fire hazard problem. Furnish dated photographs of such areas.

E. FISH AND WILDLIFE HABITAT

1. Describe and identify any rare or endangered species or unique habitats present on the site.
2. Describe any adverse impacts on significant habitat to be caused by the proposed development.
3. If adverse impacts are anticipated, describe plans for minimizing such impacts.
4. Describe possible benefits to adjoining habitats to be realized as a result of the project.

F. FLOODPLAIN ELEVATION

1. Identify on site plan 100 year floodplain and highest observed tide line. Give elevation of same.
2. Identify on site plan the State of Oregon Beach Zone Line or the top of river bank.
3. Give evidence that elevation of the lowest habitable floor will be raised above the top of the highest predicted storm wave or 100 year floodplain. Registered surveyor or engineer signed report will suffice.

G. HISTORICAL AND ARCHAEOLOGICAL SITES

1. Describe and locate on site plan any identified historical or archaeological sites.
2. Describe any protection measures that may be needed to protect the site.

H. CONDITION OF ADJOINING AREAS

1. Open Dunes
 - a. Give location of open dunes in relationship to the development site.
 - b. Indicate approximate size (acres), maximum elevation, direction of movement, and predicted rate of movement of adjoining open dune areas.
 - c. Indicate ownership of adjoining dunes and proposed future management, if known.
 - d. Indicate investigator's assessment of probable threat to development site. Furnish aerial photographs if possible.
2. Active Foredunes
 - a. Describe size (height and width) of active foredunes on adjoining areas.
 - b. Describe any threat they pose to development site.
 - c. Describe any plans for cooperative measures to alleviate problems.
3. Storm Run-off Erosion
 - a. Describe any known storm run-off or flood velocity hazards on adjoining property that might adversely affect the site. Examples might be stream, river, denuded watershed, etc.
 - b. Describe any plans for cooperative measures to alleviate problems.
4. Wave Undercutting or Wave Overtopping
 - a. Describe extent of recent or historic undercutting, length of area and height of cut.
 - b. Describe area of wave overtopping and furnish photographs or other evidence.
 - c. Describe historic stability of beaches or riverbank in the general area.

- d. Furnish investigator's assessment of possible threat to the site.

I. DEVELOPMENT IMPACTS

1. Report should include the investigator's assessment of the site's overall capability and suggest maximum use level that will not cause weight slope failure, vegetation problems from too high a density of human population, damage to aquifer, etc. This is a judgment of extreme importance because the cumulative effect of minor impacts could result in a total dune project or riverbank failure.
2. Describe any projected off site adverse impacts on adjoining or nearby properties as a result of the development.
3. Identify and list all benefits of the project (information needed to evaluate social economic gains as required by Statewide Planning Goal 9: Economy, and coordination with possible area recreation plan):
 - a. New jobs created (temporary construction and permanent)
 - b. Increased tax base or assessed valuation of completed project
 - c. Describe any newly created or restored habitat resulting from development
 - d. Describe any improvement to public access provided by the project
4. Evaluate the impact of the proposed development on seasonal surface water and drainage flow patterns and the potential impact of flooding problems resulting from the development. If the development proposes to lower the groundwater in the deflation plain, plans must accommodate problems associated with changes in the landform. The SIR should address groundwater considerations including high water table, ponding, salt-water intrusion, drawdown on sand spits, and pollution potential.

J. PROPOSED DESIGN

1. Furnish a site plan map drawn to scale. Show in detail exact location and size of all proposed structures. Scale drawing of front, back and side view are required as well.
2. Submit detailed plans and specifications for structure foundation and identify materials to be used.
3. Furnish detailed plans and specifications for the placement of all protective structures proposed.
4. Provide complete location mapping and actual work specifications for all initial, temporary, or maintenance stabilization plans proposed.
5. Furnish detailed cost estimates and post performance bond in that amount with City to accomplish stabilization or restoration proposed, if required by City.
6. Identify legal responsibilities for long range vegetation maintenance programs.
7. Describe any benefits realized from dune or river bank stabilization or restoration measures proposed.
8. Furnish copies of necessary shorefront protection permits or completed permit applications (e.g., U.S. Army Corps of Engineers, Oregon Division of State Lands, etc).
9. Furnish detailed plans and specifications for interim stabilization, permanent re-vegetation, and vegetative maintenance as proposed.
10. Furnish detailed plan for off-road vehicle and pedestrian management, if applicable.
11. Furnish detailed plan for required reclamation of areas disturbed for sand removal, road construction, logging, etc.

K. LCDC COASTAL GOAL REQUIREMENTS

1. Identify potential conflicts with Coastal Goals or LCDC-acknowledged comprehensive Plan, and Oregon's Coastal Management Program. In addition, for river bank applications, relevant Statewide Planning Goals also include: Goal 16: Estuarine Resources, Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces, Goal 6: Air, Water and Land Resources Quality, and Goal 7: Areas Subject to Natural Hazards
2. Identify efforts made in development design to resolve or minimize identified conflicts.

July 8, 2022

Scott and Sharon Hancock
4955 South Pyrite Road
Flagstaff, Arizona



**RE: EROSION/RECESSION SITE ASSESSMENT
LOT 37 SHELTER COVE
FLORENCE, OREGON
BRANCH ENGINEERING INC. PROJECT NO. 21-335**

Pursuant to your request, Branch Engineering Inc. (BEI) has performed an erosion/recession assessment of the bay frontage at the above listed location.

1.0 SCOPE OF WORK

On June 1, 2021, BEI geotechnical engineering staff conducted a geologic hazard reconnaissance of the site, general vicinity, and subsurface investigation that included three hand-auger borings and one Dynamic Cone Penetrometer test in the proposed building pad area. On May 31, 2022 BEI staff returned to the site to perform an erosion/recession assessment along the bay frontage of the property. The land-based assessment of the property's shoreline was limited to land adjacent to the property because of dense vegetation extending to the waterline. A Small Unmanned Aircraft System (UAS) drone operated by licensed BEI staff was used to photograph and observe the shoreline of the site and adjacent properties. Other resources that were utilized for the writing of this report are listed below:

- Google Earth, earth.google.com
- Geologic Map of Oregon, 1991 Walker and MacLeod. Map from US Dept. of Interior, Geological Survey
- State of Oregon, Department of Geology and Mineral Industries (DOGAMI) Bulletin 85, Environmental Geology of Coastal Lane County Oregon.
- State of Oregon, Geologic Map of Oregon website, <http://www.oregongeology.org/geologicmap/>
- United States Dept. of Agriculture, Natural Resources Conservation Service, Pacific Northwest Soils website, http://www.or.nrcs.usda.gov/pnw_soil/or_data
- State of Oregon, Department of Geology and Mineral Industries (DOGAMI) website, Statewide Geohazards Viewer (HazVu), <http://www.oregongeology.org/hazvu/>
- Geotechnical Engineering Evaluation and Design Proposed Erosion Control Project North Cove Bank Preservation Coalition Report. Ash Creek Associates, Inc. Dated May 16, 2006.

- Bank Failure Assessment, 16 Sea Watch Court Florence, Oregon. GeoScience, Inc. Dated March 18, 2011.
- National Assessment of Shoreline Change: Historical Shoreline Change Along the Pacific Northwest Coast. U.S. Department of the Interior, U.S. Geological Survey. Open File Report 2012-1007.
- Shoreline Stabilization at Station Siuslaw River Florence, Oregon. February 2012. U.S. Coast Guard Civil Engineering Unit Oakland Environmental Division. 2000 Embarcadero, Suite 200 Oakland, CA.
- Effectiveness of Spur Jetties at Siuslaw River, Oregon. Report 1 Prototype Monitoring Study 1995. U.S. Army Corps of Engineers. Waterways Experiment Station.
- Physical Processes and Geologic Hazards. Paul D. Komar, Kathy Bridges Fritzpatrick. Oregon Coastal Zone Management Association, Inc. May, 1979.
- Environmental Data Resources (EDR) Lightbox Package including Historical Topographic Maps, Aerial Imagery from 1952 to 2016, and EDR Radius Map.
- Aerial Drone Photos by BEI Small Unmanned Aircraft System (UAS) licensed staff

2.0 PROJECT LOCATION AND DESCRIPTION

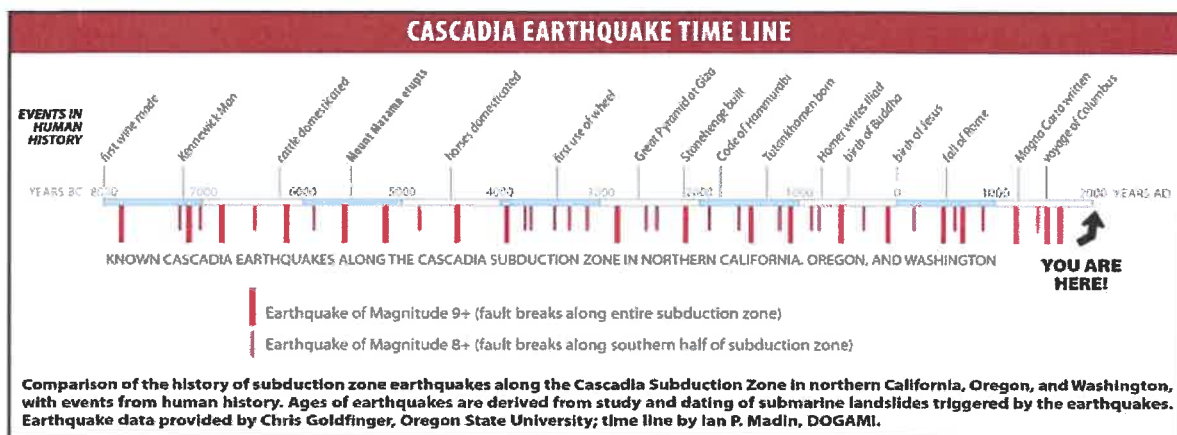
The project site is located in the Shelter Cove Phase II development in Florence, Oregon, at latitude 44.004689° north and longitude 124.124617° west. The site is accessed via a small sand and aggregate driveway off the southwest side of an unnamed, private drive that connects to the west side of Shoreline Drive.

The project site is located approximately 1.3-miles upriver from the mouth of the Siuslaw River near a projection of land called Cannery Point on the right (east) bank of the estuary. Lot 37 and the surrounding properties are located on geologically younger, marginally stabilized dune sands that formed along the banks of the Siuslaw River. Site elevations vary from approximately 97-feet above mean seal level (MSL), to the banks of the tidally influenced Siuslaw River, which can be approximated as +/- 5-feet MSL in this area. Topographically the site is a flat bench cut into the dune crest during the initial site development to provide a level building pad. Slopes vegetated with grass and short shrubs rise above this level area to the north at 25- to 30-degees, with an elevation difference of approximately 18-feet between the level bench on Lot 37 and the property to the north. The property to the south is approximately 10-feet lower in elevation and is separated by a concrete retaining wall. Slopes to the north average 30-degrees along the private accessway and are well vegetated with shrubs and scattered evergreen trees. The western slope is approximately 165-feet in length, with slopes measured at 20- to 37-degrees. This slope is covered with well established vegetation consisting of grass, shrubs, and evergreen trees. Numerous small diameter PVC pipes were noted on the slope, no obvious purpose for these pipes was ascertained during the site investigation. During both site investigations a shallow landslide located on the bay shore slopes of Lot 36 was observed and is discussed further in this report.

3.0 SITE GEOLOGY AND GEOLOGIC HAZARD MAPPING

The subject site is located near the northern extent of the longest coastal strip of sand dunes on the Oregon Coast. The sand dunes in the area likely formed post ice-age during the Late Pleistocene to the Holocene epoch by eolian processes associated with the activity of wind and changes in sea levels; however, limited studies performed by Beckstrand 2001, and Peterson 2002 show that some dune formation occurred as early as 37,00 years ago. The typical pattern seen in the area is active transverse dunes (running parallel to the ocean) caused by the varying on, and off shore winds, with areas of deflation plains, lying inland and between active or stabilized dune areas where the water table is exposed or near the surface. The north shore of the Siuslaw in the project vicinity is mapped as geologically younger (Late Pleistocene to Holocene), marginally stabilized dune sand composed of fine-grained, poorly sorted sand with little topsoil formation. Based on work done by Ash Creek Associates and others in the project vicinity, including ours, the underlying geologic unit referred to as Marine Terrace Deposits (MTD) was found exposed along the shoreline. This unit formed during the Pleistocene when sea levels were lower than at present, and is composed of estuarine, flood-plain, marine, fluvial sediments, and buried topsoil horizons deposits. In the project vicinity the MTD unit is composed of dune deposits that underwent periods of extensive topsoil formation and subsequent burial. The weathering of minerals led to the formation of clay and iron oxide deposits that cement the sand grains and act an aquitard, restricting the vertical hydraulic conductivity of groundwater in the area. During the site investigation groundwater was observed flowing from the boundary of the MTD and overlying dune sand on the adjacent lot to the north.

The site is located approximately 60-miles east of the Cascadia Subduction Zone, which is a zone of converging tectonic plates that historically produces major earthquake events that is located to the west of the Oregon Coast. The figure below shows a timeline of historical Subduction Zone earthquake events. The nearest mapped active fault is approximately 7.3-miles to the southwest of the site and is labeled as a part of the Cascadia fold and fault belt.



The HazVu website shows that the subject site is expected to experience severe shaking in the event of a Cascadia Subduction Zone earthquake and very strong shaking for lesser earthquakes. HazVu has also characterized the site as having a high-risk landslide and for earthquake induced liquefaction of the subsurface soils.

4.0 SITE SOIL AND GROUNDWATER

Three exploratory hand-auger borings were advanced on the relatively flat portion of the property to approximately 4.5-feet below ground surface (BGS) during the June 1, 2022 site visit. Site soils generally consist of tan-brown, poorly graded, fine-grained sand. Moisture contents of the sand were generally observed to be damp after penetrating below the dry crust of the surficial sand. Even though no moist or wet sand was observed at either boring location, the sands observed are expected to exhibit rapid dilatancy when saturated.

Site work performed by Ash Creek Associates in 2006 in the northern portion of the Shelter Cove development found dune sand from the surface to a depth of at least 60-feet BGS, overlying the MTD deposits of organic sandy clays and silts. Inclometers placed during their investigation were used to assess groundwater depths, which were determined to be in the range of 21- to 24-feet above MSL. We expect the groundwater level to fluctuate seasonally with higher groundwater levels observed during the wet season; generally late October to late May.

To assess the soil type and groundwater during the May 31, 2022 site investigation BEI staff accessed the bay frontage of the property. The MTD deposits along the adjacent lot to the north were exposed and consisted of dense partially cemented, poorly graded sand with silt and clay. The MTD deposits above the waterline stood vertical for approximately 3- to 7-feet in height, the MTD deposits extended below the waterline to an unknown depth. An area of deposition along the piers near Cannery Point was noted from drone photos. In this area it appears the MTD deposits extend further out into the bay. Hand probing areas close to shore had 1- to 2-feet of loose sand overlying the MTD shelf that projected out into the bay. Groundwater was noted issuing from the boundary between the MTD deposits and the overlying sand. The rate varied, but was estimated to be at least a gallon per minute in areas where erosion had concentrated the flow. Piping of the overlying sand deposits was noted where the groundwater flow volume was highest. Deposits of the sand were also noted in the water below these areas.

Photo 1: MTD deposits and groundwater issuing from the boundary with overlying sand.



The bay frontage of Lot 37 was densely vegetated; however, BEI staff were able to access the north edge and use the drone to visually assess the frontage. Rip-rap boulders varying from less than 1-foot in diameter, to several feet in diameter were noted along the waterline extending at least 3- to 4-feet up the slope. Based on imagery from the drone and the land-based perspective from the northwest property corner, the slope drops steeply into the bay from the rip-rap edge. In areas along the bay frontage, the aerial imagery appears to show “shadows” along the slope below the waterline, which could be cavities or concave slopes below the waterline. It is BEI’s opinion that the MTD deposits below the waterline may be vertical to concave.

5.0 EROSION AND RECESSION NOTED DURING RECONNAISSANCE

Based on historical imagery obtained from EDR Lightbox (attached) for the following years 1954, 1976, 1982, 1988, 1994, 2000, 2005, 2009, 2012, 2016, and Google Earth Imagery for the years 2005, 2012, 2016, and 2019, the site has experienced periods of bay shore erosion; however, the most significant alternation to the site is associated with mass grading of the area during the development of the Shelter Cove subdivision. The resolution of the aerial images also makes determining a rate of erosion for the site difficult as the precision of any measurements would be on the order of tens of feet. The 1954 aerial photo shows the site vicinity as partially vegetated dunes descending as sand clear of vegetation to the river bank. By 1976 a series of four groins (constructed in 1974) on the south bank of Siuslaw Bay. One of the groins is directly across the bay from the site. Also visible in the 1976 aerial photo is an area of sand clear of vegetation in the site vicinity. This area was vegetated in the 1954 aerial photo. The site vicinity remains relatively unchanged until the 1994 aerial image that shows construction of the Shelter Cove subdivision altering the site and vicinity by removing vegetation and performing mass grading operations. Mass grading of the site appears to consist of a flattening of the dune for a building pad and clearing of the slope to the bay. In the 1994 aerial photo the slopes descending to Siuslaw Bay are mostly clear of vegetation and remain relatively clear until the 2009 to 2012 aerial photos that show sparse vegetation in 2009, and relatively dense vegetation in 2012. Sometime between 2012 and the next available aerial image in 2016, a shallow landslide begins to develop on the adjacent lot’s bayside slopes to the north. At the time of BEI site visits in 2021 and 2022 the landslide appeared to be entirely within the adjacent lot to the north; however, we were not able to locate property corners so this could not be confirmed. The exact cause of the landslide is unknown, but based on the lack of rip-rap armoring, we suspect that a combination of piping of the sand overlying the MTD deposits, and erosion of the MTD deposits lead to recession at the toe of the slope to the point where the overlying sand experienced a loss of lateral support and translational landslide resulted. Because of the dense vegetation along the slope and bay frontage of Lot 37, the site investigation was limited to the periphery and aerial reconnaissance using a drone. The bay frontage of the site appears to be composed of rip-rap that extends up into the vegetation a distance of 3- to 4-feet where it was visible. Below the vegetation line, which roughly corresponds to the high-water line, the rip-rap extends for a short distance before the shore drops off near vertical, to vertical with depths greater than 6-feet (estimated with a stick at the northwest corner). Drone photographs show the conditions observed in the northwest corner to be consistent along the length of the property. Shadows along the submerged bank indicate possible areas of concavity that may be undercut submerged banks in the MTD deposits.

Photo 2: Lot 36 (presumed left of vegetation line) and part of Lot 37 are visible in this photo. Note the exposed sand from the landslide on Lot 36, loose sand deposited below the waterline on left half of photo, and the dense vegetation and deeply incised banks below the waterline on Lot 37.



6.0 SUMMARY OF FINDINGS

Based on the site reconnaissance, research, and aerial imagery dated from 1954, to the site visits conducted by BEI, the site has experience erosion from the Siuslaw Rivers flow and the daily tidal flux. However; rip-rap placed along the bay shore at the project site and continuing upriver appears to have slowed the erosion as no visible shoreline changes are readily apparent at the site from at least 1994 to the time of BEI investigation. In the 2011 report *Final Preliminary Erosion Control Study. USCG 2011*, at the Coast Guard station located approximately 1000-feet to the southeast of the project site the main drivers for erosion were determined to be the natural meandering process of the river accelerated by alterations to the river and bays shoreline in the area. The Coast Guard station and the project site are located in similar geomorphological positions, so comparisons are within reason. With a groin located on the opposite bank and a similar position on a semi-vegetated dune that drops down a sand bank to the bay shore. At the project site, rip-rap appears to have been placed along the bay shore sometime between 2000 and 2005. How far the rip-rap was placed into the bay to protect the toe from scour is unknown. The rip-rap has protected the exposed bank to some degree, but based on the near vertical bank below the shoreline, erosion seems to have continued removing material from the submerged bank.

7.0 Conclusions

Because of the project sites geomorphological position, the erosional undercutting of the shoreline is expected to continue. Groins placed on the south bank are likely acting to focus the rivers flow, deflecting the energy to the opposite (east) bank and increasing the flow velocity. This process will likely accelerate due to climate change, expected sea level rise, and an increasing frequency and intensity of storm events. The likelihood of the landslide on the adjacent lot increasing in size should be considered high. The piping of the overlying sand at the boundary of MTD deposit was noted in several places at the base of the landslide and will continue to mobilize sand at the boundary. Based on our observations and professional opinion, the highest risk to site development would be continued erosion of the bank below the rip-rap eventually causing a failure which exposes the sand overlying the MTD deposit. This could result in a landslide similar to the one on the adjacent lot which would then experience further erosion due to piping of sand at the contact of the sand overlying the MTD deposit. Using the aerial images from the placement date of the rip-rap (definitively in 2005), Lot 37 appears to have experienced minimal erosion of bank. Erosional loss from 1954 to the definitive date of rip-rap placement in 2005 appears to be on the order of 20 or more feet, but because of the resolution of the photos and difficulty in reference position, the error is at least equal to the estimated erosion rate. Erosion rates measured (USGS 2011 report) for the MTD deposits at the Coast Guard Station are approximately 1- to 2-feet per year. Based on proximity and similar geomorphic position, it is our opinion that the MTD erosion rate measured at the Coast Guard Station is applicable for project vicinity. Given a 50-year residential design life and the measured erosion rates of 1- to 2-feet per year, approximately 50- to 100-feet of bank recession could be anticipated with no corrective measures to arrest the erosion. Using a bank recession of 50- to 100-feet over 50-years, and a slope angle of 30-degrees, approximately 80- to 130-feet of land has the potential to be lost from the level portion of the property.

8.0 RECOMMENDATIONS

At the time of our site observations site slopes and the shoreline appear to be stable; however, if left unchecked the erosion of submerged bank material is expected to continue. To determine a site-specific rate of erosion and possible mitigation methods, the shoreline of the site would need to be accurately surveyed. If possible, an investigation utilizing either sonar, or if conditions permit, a water-based reconnaissance of the conditions below the waterline would need to be conducted. A survey of the site would also determine if the landslide on the adjacent lot was contained within that lot.

9.0 REPORT LIMITATIONS

The conclusions and recommendations in this report are based on the conditions described in this report and are intended for the exclusive use of Scott and Sharon Hancock and their representatives for use in the site development design and construction. Services performed by the geotechnical engineer for this project have been conducted with the level of care and skill exercised by other current geotechnical professionals in this area under similar budget and time constraints. No warranty is herein expressed or implied.

The conclusions in this report are based on the site conditions as they currently exist and it is assumed that the limited site locations that were physically investigated generally represent the conditions at the site. Should site development or site conditions change, or if a substantial amount

of time goes by between our site investigation and site development, we reserve the right to review this report for its applicability. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office. This report presents BEI's site observations, site research, site explorations, and recommendations for the proposed site development.

Sincerely,
Branch Engineering Inc,

Ronald J. Derrick



The seal is circular with the text "REGISTERED PROFESSIONAL ENGINEER" around the top arc and "RONALD J. DERRICK" around the bottom arc. In the center, it says "#16170" and "OREGON". Below the seal, the text "SEPT 15, 1992" is visible. To the right of the seal, there is a timestamp: "2.07.08 09:58:38 -07'00'".

EXPIRES: 12/31/2023

Sam Rabe EIT
Engineering Technician

Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer



Vicinity Photo From Google Earth Dated 4/29/2019

0' ————— 1000'



SITE VICINITY PHOTO - LOT 37 SHELTER COVE
TAX MAP 18-12-16-41 LOT 700

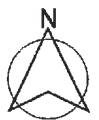
FIGURE-1
6-20-2022

BEI PROJECT NO. 21-335-01



Tax Map Photo From Lane County Dated 2021

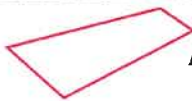
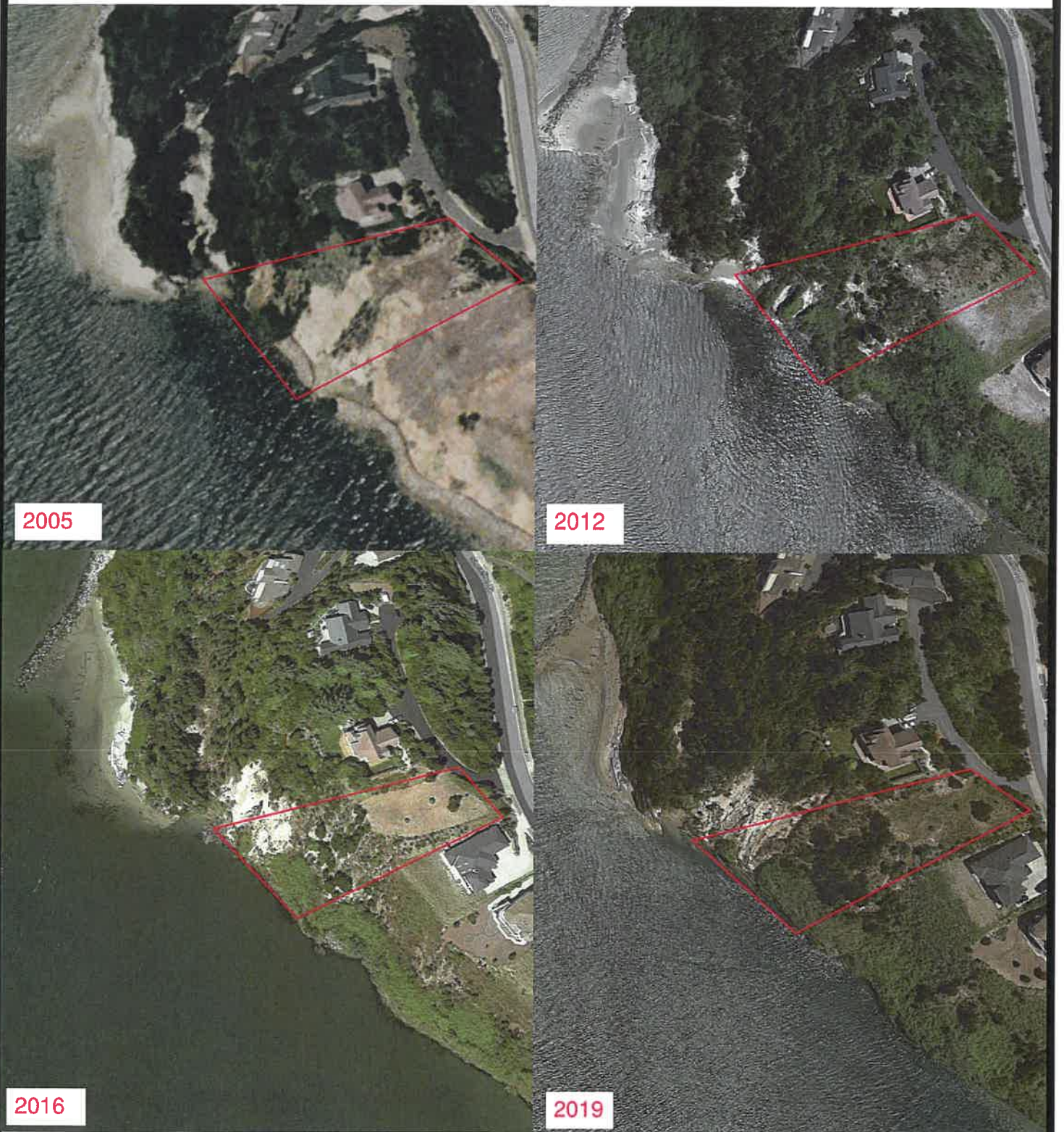
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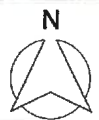
SITE LOCATION MAP - LOT 37 SHELTER COVE
TAX MAP 18-12-16-41 LOT 700

FIGURE-2
6-20-2022

BEI PROJECT NO. 21-335-01



Area Investigated



Site Area Photos From Google Earth, Not to Scale

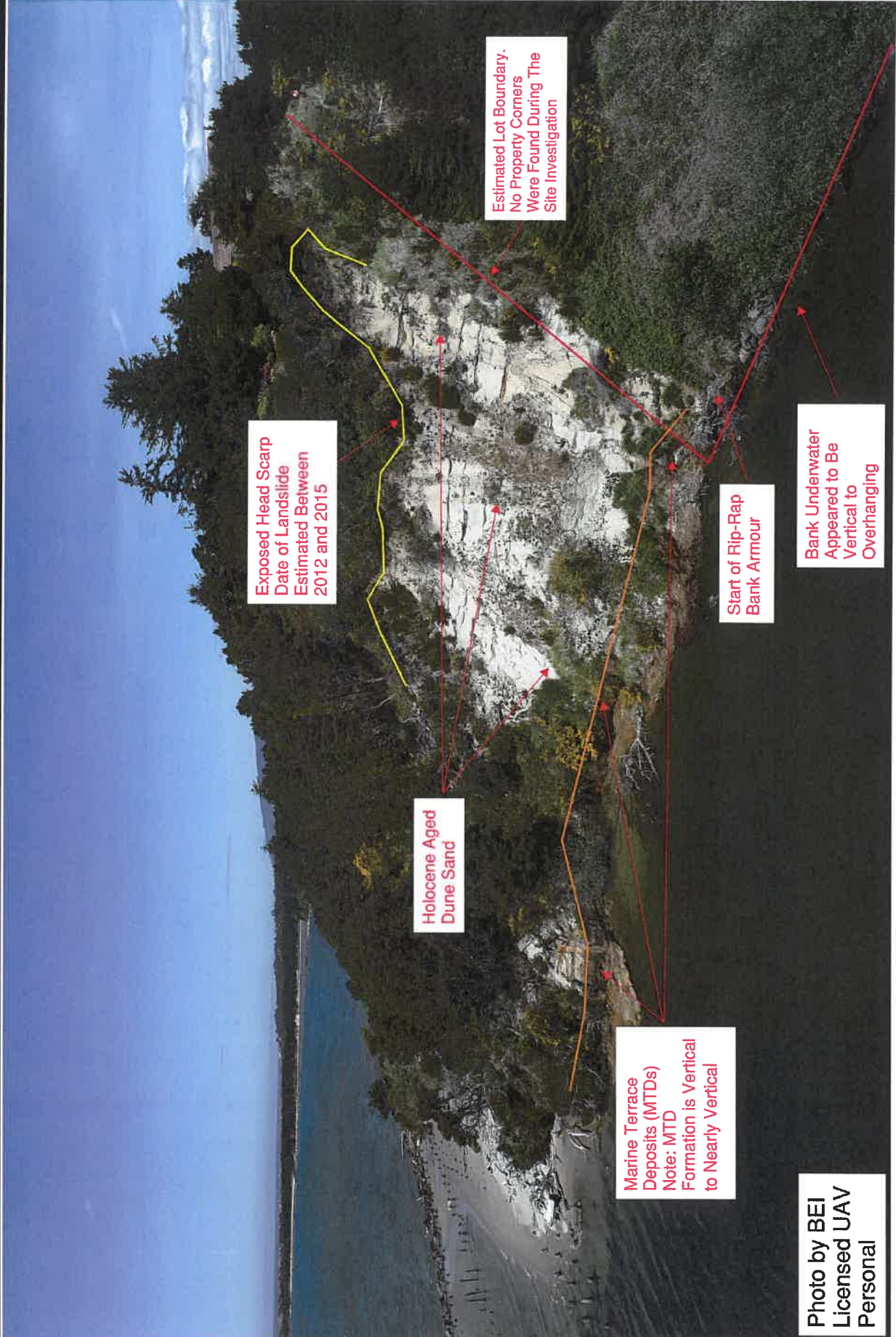


SITE AERIALS PHOTOS 2005, 2012, 2016, 2019
 LOT 37 SHELTER COVE
 TAX MAP 18-12-16-41 LOT 700

FIGURE-3

6-20-2022

BEI PROJECT NO. 21-335-01



Exposed Head Scarp
Date of Landslide
Estimated Between
2012 and 2015

Estimated Lot Boundary.
No Property Corners
Were Found During The
Site Investigation

Holocene Aged
Dune Sand

Marine Terrace
Deposits (MTDs)
Note: MTD
Formation is Vertical
to Nearly Vertical

Start of Rip-Rap
Bank Armour

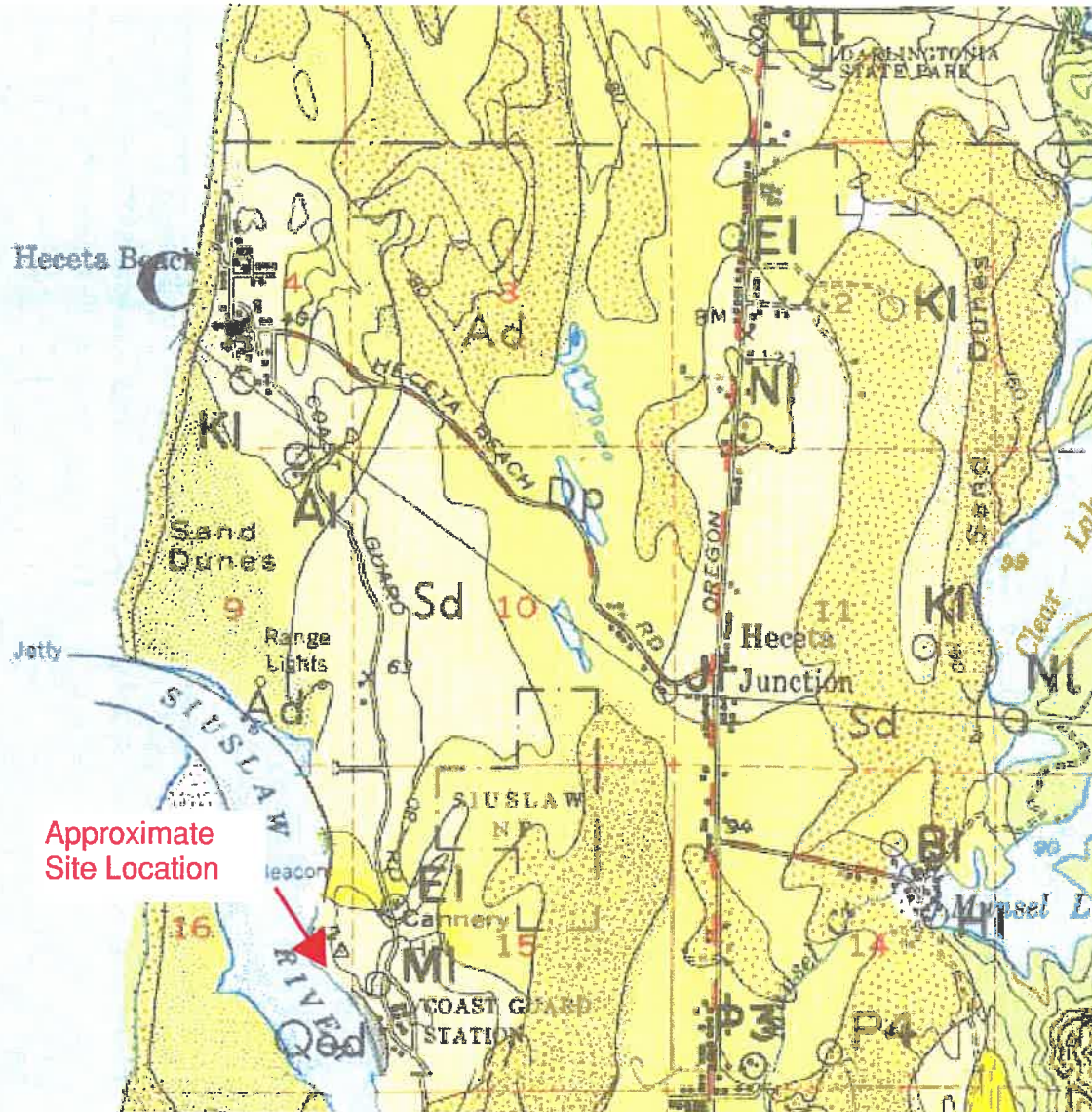
Bank Underwater
Appeared to Be
Vertical to
Overhanging

Photo by BEI
Licensed UAV
Personal

FIGURE-4
6-20-2022

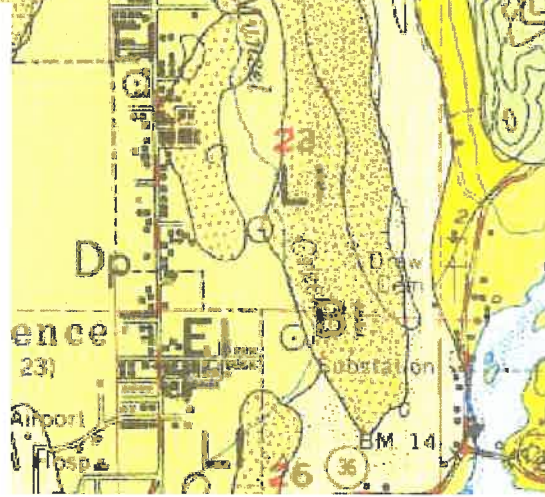
SITE GEOMORPHOLOGICAL AND GEOLOGIC FEATURES
LOT 37 SHELTER COVE TAX MAP 18-12-16-41 LOT 700





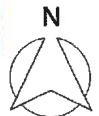
Approximate Site Location

- Ad** **Active dunes**
Deposits of open sand up to 200' thick which move in response to wind. Composed of clean fine sand but locally may have layers of silt, clay, and peat, and hard iron-stained layers a few inches thick. Buried soil horizons may be present at several levels.
- Sd** **Stabilized dunes**
Old dunes covered by vegetation; weak to moderate soil development overlying unconsolidated fine sand. Iron bands and buried soil horizons are common.
- Dp** **Deflation plain**
Interdune areas eroded by wind to the summer level of the water table. Includes wet, plant- and brush-covered areas partly flooded most of winter and spring months when the water table is high.
- Qt** **Elevated alluvial terrace deposits**
Remnants of former river flood plain along the north side of the Siuslaw River and near the mouth of Big Creek; composed of silt, sand, and thin gravel.



Site Map From DOGAMI

0 ————— 1-mile



SITE GEOLOGY MAP
LOT 37 SHELTER COVE
TAX MAP 18-12-16-41 LOT 700

FIGURE-5

6-20-2022

BEI PROJECT NO. 21-335-01



Lot 37 Shelter Cove

55 Shoreline Drive

Florence, OR 97439

Inquiry Number: 7019153.8

June 14, 2022



The EDR Aerial Photo Decade Package



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

06/14/22

Site Name:

Lot 37 Shelter Cove
55 Shoreline Drive
Florence, OR 97439
EDR Inquiry # 7019153.8

Client Name:

Branch Engineering
310 5th Street
Springfield, OR 97477
Contact: Ron Derrick



Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

<u>Year</u>	<u>Scale</u>	<u>Details</u>	<u>Source</u>
2016	1"=500'	Flight Year: 2016	USDA/NAIP
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2005	1"=500'	Flight Year: 2005	USDA/NAIP
2000	1"=500'	Acquisition Date: January 01, 2000	USGS/DOQQ
1994	1"=500'	Acquisition Date: January 01, 1994	USGS/DOQQ
1988	1"=500'	Flight Date: July 20, 1988	USGS
1982	1"=500'	Flight Date: July 12, 1982	USDA
1976	1"=500'	Flight Date: May 01, 1976	USGS
1954	1"=500'	Flight Date: October 01, 1954	USGS
1952	1"=500'	Flight Date: October 14, 1952	USDA

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INQUIRY #: 7019153.8

YEAR: 2016

— = 500'





INQUIRY #: 7019153.8

YEAR: 2012

— = 500'





INQUIRY #: 7019153.8

YEAR: 2009

— = 500'



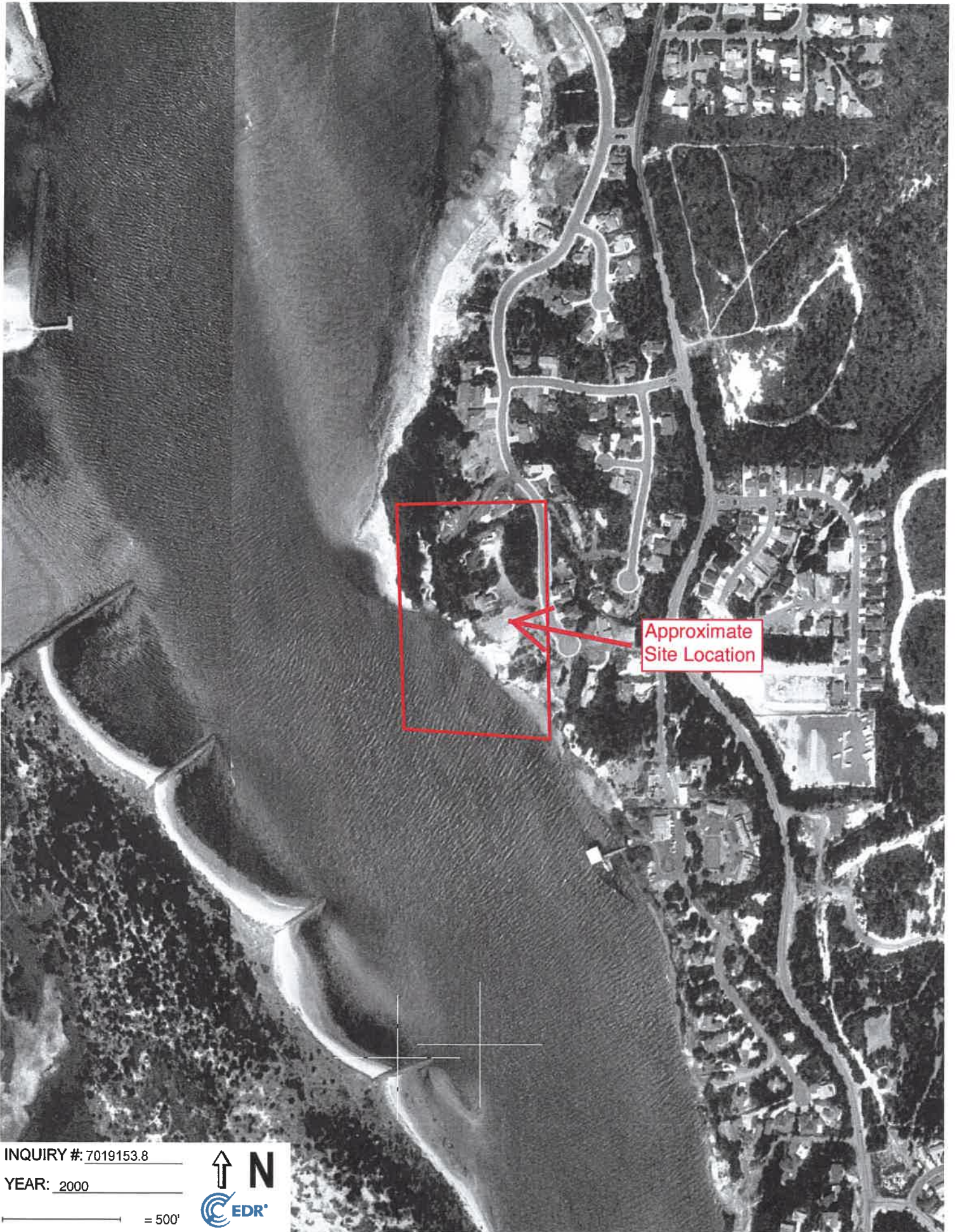


INQUIRY #: 7019153.8

YEAR: 2005

— = 500'





INQUIRY #: 7019153.8

YEAR: 2000

_____ = 500'





INQUIRY #: 7019153.8

YEAR: 1994

_____ = 500'



Subject boundary not shown because it exceeds image extent or image is not georeferenced.



INQUIRY #: 7019153.8

YEAR: 1988

— = 500'





Approximate Site Location

INQUIRY #: 7019153.8

YEAR: 1982

— = 500'





INQUIRY #: 7019153.8

YEAR: 1976

— = 500'





INQUIRY #: 7019153.8

YEAR: 1954

— = 500'

