Sitka Land Suitability and Feasibility Study
Phase I Summary and Recommendations

December 10, 2025

PND Project No. 242091

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EXECUTIVE SUMMARY

CBS LAND SUITABILITY AND FEASIBILITY STUDY – PHASE I SUMMARY REPORT

The City and Borough of Sitka (CBS) initiated the Land Suitability and Feasibility Study (LSFS) to evaluate municipally owned lands for potential residential housing development. This Phase I report summarizes the preliminary feasibility screening conducted by PND Engineers, Inc. (PND), focusing on comparative assessment rather than detailed design or cost estimating. The study evaluated nine CBS-owned parcels spanning a range of physical environments, infrastructure conditions, and regulatory constraints.

A Multi-Criteria Decision Analysis (MCDA) framework was developed to systematically compare each site using weighted criteria organized into three primary categories: Constructability, Density Potential, and Desirable Community Factors. Criteria included slide risk, access, physical conditions, proximity and capacity of utilities, transportation capacity, environmental impacts, and proximity to services. Scoring was normalized and weighted in coordination with the CBS Planning Department and Planning Commission.

Phase I work included site visits, desktop evaluations, review of topographic and hazard data, wetland assessments, and completion of a detailed Utility Capacity Study (Appendix C). The utility analysis assumed single-family residential development at the minimum lot size permitted by Sitka General Code (SGC) Section 22.20.030 (6,000 SF per lot), with a 65% land-use efficiency factor applied to account for roadways, easements, and undevelopable areas. While future phases may adjust density assumptions to consider duplex or multi-family development, Phase I utility modeling and scoring serve as the baseline for comparative feasibility.

Results indicate that Osprey Street and the Sitka High School (SHS) site represent the most feasible near-term development opportunities, with strong utility access, minimal hazard constraints, and lower infrastructure upgrade requirements. Larger sites such as Gavan Hill and Benchlands offer substantial development potential but require additional investigation and system upgrades to address wastewater capacity, drainage, and geohazard considerations.

The Indian River parcel was reviewed only to evaluate the feasibility of constructing a roadway through the CBS owned parcel to access Alaska Department of Natural Resources owned land north of the subject area, which CBS is considering acquiring. While a roadway is feasible, constraints exist, including significant wetlands, compressible soils and general proximity to the Indian River floodplain. The Indian River parcel has been omitted from the Phase I Decision Matrix.

Table 1 - Phase I Overall Ranking Summary

Rank	Site	Decision Matrix Score*	Key Observations
1	Osprey Street	90.00	Highly feasible infill site with minimal infrastructure and environmental constraints.
2	Sitka High School	71.67	Strong urban adjacency and utilities, limited by small parcel size and wastewater capacity.
3	Benchlands	55.42	Large buildable area with wetland presence, utility limitations and slope constraints.
4	Harbor Mountain Road	53.25	Moderate feasibility with hydrologic and slope constraints.
5	Gavan Hill	52.58	Significant development capacity but requires system upgrades and environmental impacts.
6	Green Lake Road	41.67	Extensive utility and environmental constraints.
7	Herring Cove Peninsula	35.83	Severe physical and infrastructure constraints.
8	Upper Edgecumbe Drive	34.33	Poor access and slope-driven feasibility limitations.

*Indian River parcel has been removed from active consideration pending land acquisition decisions.

Phase I concludes with recommendations to eliminate the lowest-ranking sites from further evaluation and prioritize a focused, higher-resolution investigation of the top-ranked sites in Phase II.

This Phase I report is intended to inform strategic land-use planning and capital prioritization decisions by the CBS Planning Commission and Assembly. It does not represent a final determination of site developability, but rather a structured screening tool used to identify where municipal investment in further engineering and planning effort is most warranted. Phase II will build upon these findings through more detailed technical studies and site-specific feasibility refinement.

December 10, 2025
Project No. 242091

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1. BACKGROUND AND OBJECTIVE

The City and Borough of Sitka initiated this project to determine the feasibility of developing residential housing on selected municipally owned parcels. PND Engineers, Inc. was retained to provide engineering support and technical analysis to inform site selection and development strategy. CBS identified the following nine study areas:

- Gavan Hill
- Sitka High School
- Upper Edgecumbe Drive
- Benchlands
- Harbor Mountain Road
- Indian River (reviewed for access road construction)
- Green Lake Road
- Herring Cove Peninsula
- Osprey Street

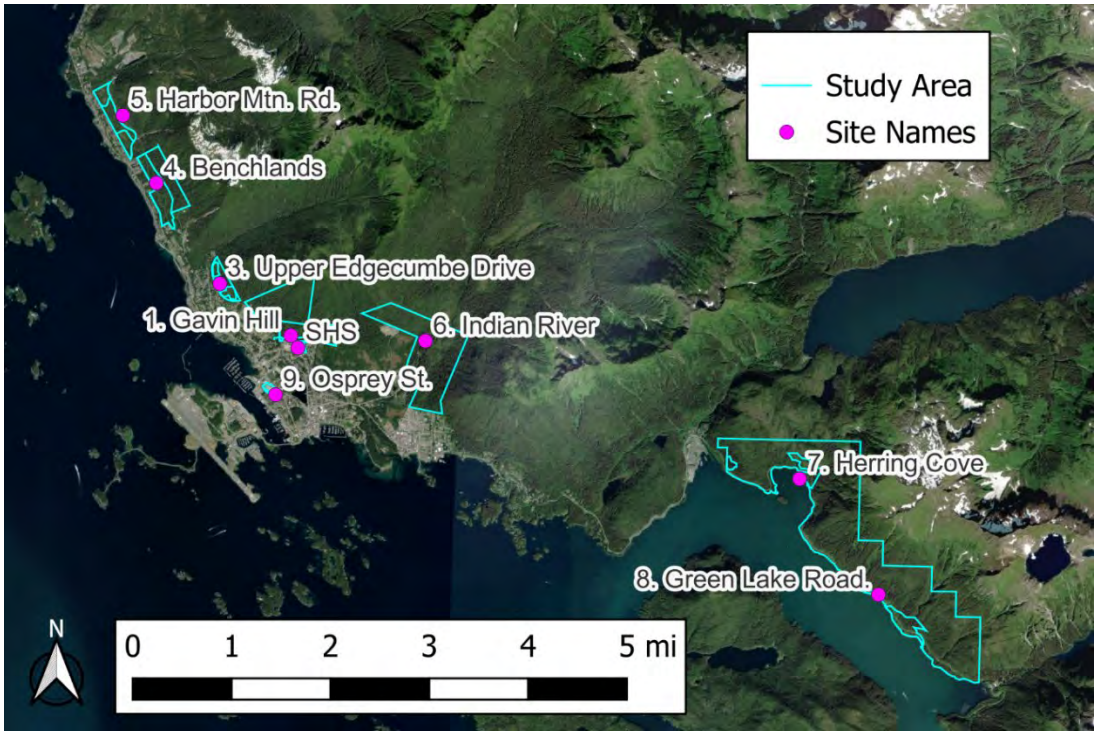


Figure 1 - Study Areas

This report summarizes Phase I findings, establishes a defensible comparative ranking of sites, and identifies recommended next steps to refine feasibility and reduce uncertainty prior to potential development.

2. SUMMARY OF PHASE I WORK

Phase I activities included:

- Site visits and photographic documentation.
- Desktop review of topography, hydrology, landslide risk, and environmental constraints.
- Preliminary buildable area mapping using LiDAR data.
- Wetland reconnaissance and delineation studies.
- Utility capacity analysis (water, wastewater, and electrical).
- Development and refinement of the Decision Matrix.
- Coordination with CBS Planning and Planning Commission staff

All assessments conducted during Phase I are considered preliminary and intended to support feasibility screening rather than final design or construction readiness.

3. DECISION MATRIX CRITERIA SUMMARIES AND SCORING

PND developed a Multi-Criteria Decision Analysis (MCDA) system to provide a consistent and defensible method for comparing development feasibility among study areas. Criteria were organized into three primary categories: Constructability, Density Potential, and Desirable Community Factors. Each criterion was evaluated using defined, objective rating rubrics and then normalized and weighted to provide Decision Matrix output scores and site rankings. Weights applied to each Decision Matrix criterion were established through coordination with the CBS Planning Department and Planning Commission to reflect community priorities, implementation feasibility, and anticipated cost exposure. A memorandum summarizing rating descriptions and weightings is provided in Appendix F. The criteria definitions and site-specific scoring summarized below are intended to clearly demonstrate the objective basis for each assigned score. The Final Decision Matrix can be found in Appendix G.

3.1 CONSTRUCTABILITY

The items in this category relate to the constructability of each site. While detailed cost estimates have not yet been developed, these criteria consider factors that directly influence construction complexity, logistical feasibility, and overall project cost. All constructability criteria apply only to areas deemed buildable within each parcel, generally defined as those with slopes of 15 percent or less based on available LiDAR topographic data. Appendix B contains maps of each site with slopes and assumed buildable areas identified.

3.1.1 SLIDE RISK FACTORS

To evaluate potential impacts from landslides or debris flows, PND reviewed prior hazard assessments and the TerrainWorks landslide runout mapping for Sitka (https://sitkalandslide.org/). Each site was assessed using the following two objective criteria:

1. *Unmitigated Runout Potential* – Could a landslide or debris flow reach the site assuming no influence from existing vegetation or infrastructure?

2. *Runout Potential Under Existing Conditions* – If Criterion 1 was answered "Yes," would material still be expected to reach the site after considering topography, vegetation, and built features that may deflect, dissipate, or obstruct flow?

Sites were scored as follows:

- 3 – High Vulnerability: "Yes" to both criteria
- 2 – Moderate Vulnerability: "Yes" to Criterion 1 and "Unlikely" to Criterion 2
- 1 – Low Vulnerability: "Unlikely" to Criterion 1

Site Specific Scoring for Slide Risk Factors

- Gavan Hill: Debris flow modeling presented by Shannon & Wilson (2019) indicates material could reach portions of the site. The western portion, immediately north of Sitka High School, and the easternmost portion lie outside of the modeled worst-case runout footprint potentiall allowing for targeted development. Slide Risk Score: 2.

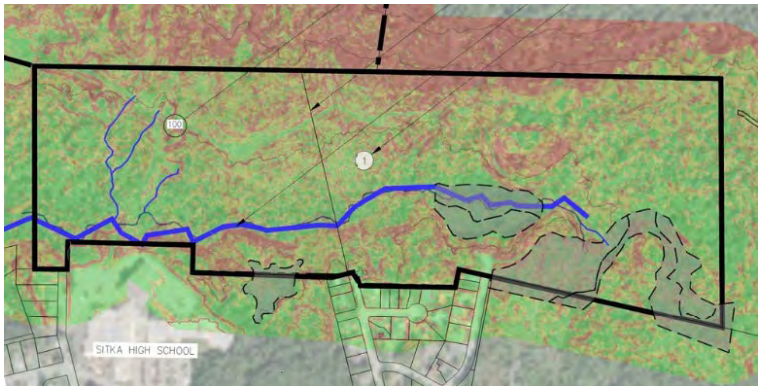


Figure 2 - Gavan Hill Site

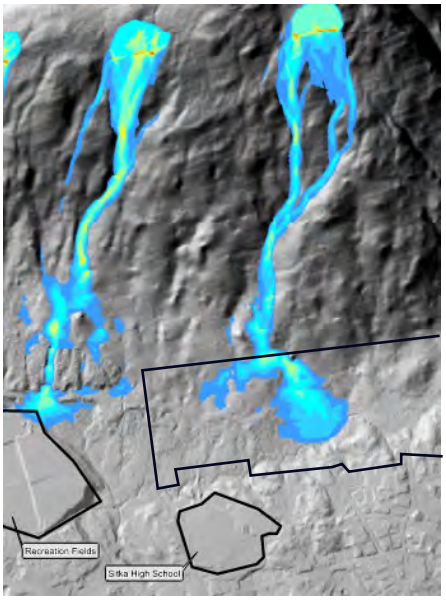


Figure 3 - Gavan Hill Worst-Case Debris Flow Model by Shannon and Wilson

- Sitka High School: The developable area east of the High School lies outside the modeled worst-case debris flow footprint. Slide Risk Score: 1.
- Upper Edgecumbe Drive: Although shallow slopes exist in portions of the site, steep terrain immediately east presents potential debris flow generation zones. Further detailed hazard analysis would be required prior to development. Slide Risk Score: 3.

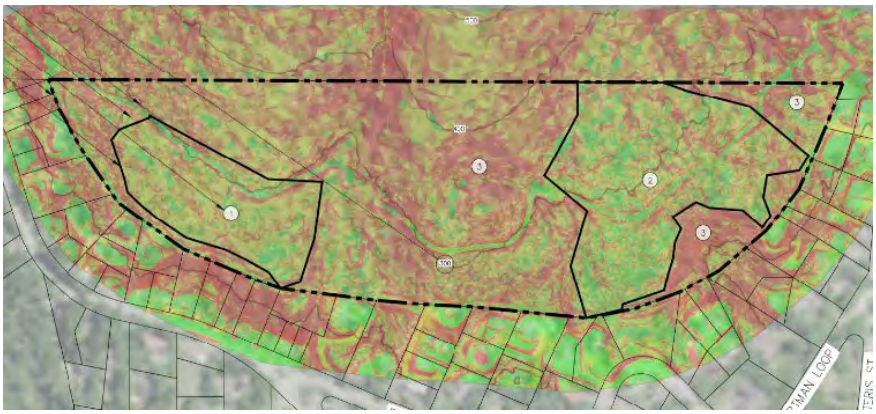


Figure 4 - Upper Edgecumbe Drive Site

- Benchlands: Considering the north and south Kramer debris flows that occurred in August 2015 and the potential for similar debris flows to occur in the area, this site receives a score of 3 at this time. It is likely that there are parcels—particularly those located west of Kramer Drive—within the area that have a low risk of being impacted by landslides and debris flows but there is not enough information available to accurately make this assessment at this time. The Benchlands area would benefit from additional debris flow modeling and a study aimed at determining how the risk of slide impact varies across the area and what can be done to mitigate the risk. Slide Risk Score: 3.
- Harbor Mountain Road: Site 1 and Site 2 have relatively shallow grades within the polygons shown in the figure below and are conducive to development from that standpoint. Steep grades that could potentially produce landslides and/or debris flows are located east of the developable sites; however, the shape of the upslope terrain tends to promote landslide/debris flow material to travel to the east of the sites according to the TerrainWorks mapping. Slide Risk Score: 2.

Figure 5 - Harbor Mountain Road Sites

- Indian River: This site was removed from active consideration pending land acquisition decisions. Western portions demonstrate long runout characteristics and low relative risk for road construction.
- Green Lake Road (Part 1) and Herring Cove Peninsula: Portions near the Herring Cove trailhead show low risk, while other segments exhibit moderate to high susceptibility. Slide Risk Score: 2.
- Green Lake Road (Part 2): Located at the base of steep slopes with short runout distances required for impact. Score: 3.

  Green Lake Road receives a composite score of 3.
- Osprey Street: Located sufficiently distant from steep terrain; low likelihood of impact. Score: 1.

Table 2 - Slide Risk Scoring Summary

Site	Score
Gavan Hill	2
Sitka High School	1
Upper Edgecumbe Drive	3
Benchlands	3
Harbor Mountain Road	2
Green Lake Road	3
Herring Cove Peninsula	2
Osprey Street	1

3.1.2 CONSTRUCTION ACCESS

Construction access was evaluated based on proximity to suitable roadways, continuity of buildable areas, and logistical feasibility for construction equipment and material movement.

Scores were assigned as follows:

- 1 – Good Construction Access
- 2 – Average Construction Access
- 3 – Poor Construction Access

Site Specific Scoring for Construction Access

- Gavan Hill: Access via Pherson and Charles Streets is constrained by Peterson Creek and anticipated construction volumes. Additional access via Lake Street would likely be required. While ROW exists, the end of Lake Street is not currently fully developed. Construction Access Score: 2.
- Sitka High School: Small site accessed via Charles Street and Bahrt Circle with direct ROW connection. Construction Access Score: 1.
- Upper Edgecumbe Drive: No direct ROW access; internal road development through difficult terrain required to reach discontinuous buildable areas. Construction Access Score: 3.
- Benchlands: Adequate access via Kramer Avenue with connectivity from both ends. Construction Access Score: 1.

Table 3 - Construction Access Scoring Summary

Site	Score
Gavan Hill	2
Sitka High School	1
Upper Edgecumbe Drive	3
Benchlands	1
Harbor Mountain Road	2
Green Lake Road	2
Herring Cove Peninsula	2
Osprey Street	1

- Harbor Mountain Road: Access available via Harbor Mountain Bypass, but discontinuous buildable areas necessitate multiple mobilizations. Construction Access Score: 2.
- Indian River: Development limited; road access would require significant clearing and permitting.
- Green Lake Road / Herring Cove Peninsula: Roadway exists but buildable areas are discontinuous and dispersed. Construction Access Score: 2.
- Osprey Street: Adequate access via existing ROW. Construction Access Score: 1.

3.1.3 PHYSICAL CONDITIONS

Physical condition assessments considered topography, geotechnical potential, wetland prevalence, hydrologic setting, and clearing requirements. These evaluations were limited to desktop analysis and professional familiarity with local conditions. Topographic assessments are based on available LiDAR data which may be subject to error, especially in heavily treed regions. No geotechnical or hydrologic studies were conducted during Phase I.

Scores were assigned as follows:

- 1 – Highly Conducive to Development
- 2 – Conducive to Development
- 3 – Minimally Conducive to Development

Site Specific Scoring for Physical Conditions

- Gavan Hill: Large, relatively flat contiguous area. Limited by clearing, and wetland constraints. Peterson Creek, an anadromous creek, further limits development. Physical Conditions Score: 2.
- Sitka High School: Clearing required and central hill removal anticipated; limited wetland presence. Physical Conditions Score: 2.
- Upper Edgecumbe Drive: Heavily treed with marginal slopes and discontinuous developable areas. Physical Conditions Score: 3.
- Benchlands: Wetlands and slope conditions limit full buildout efficiency. Physical Conditions Score: 2.
- Harbor Mountain Road: Steep terrain and wetland coverage dominate; hydrologic impacts likely. Physical Conditions Score: 3.
- Indian River: Not evaluated for residential development. Road access through the site, while feasible, would encounter constraints, including significant wetlands, compressible soils and general proximity to the Indian River floodplain.
- Green Lake Road / Herring Cove Peninsula: Extensive constraints including wetlands and FERC boundary and associated inundation limits. Physical Conditions Score: 3.

Table 4 – Physical Conditions Scoring Summary

Site	Score
Gavan Hill	2
Sitka High School	2
Upper Edgecumbe Drive	3
Benchlands	2
Harbor Mountain Road	3
Green Lake Road	3
Herring Cove Peninsula	3
Osprey Street	1

- Osprey Street: Stable, urban infill site with minimal clearing needs. Physical Conditions Score: 1.

3.1.4 PROXIMITY TO UTILITIES

Utility proximity is discussed in detail within the Utility Capacity Study (Appendix C). Scores represent relative proximity to existing water, wastewater, and electrical infrastructure.

Scores were assigned as follows:

- 1 - Good Access: All utilities adjacent to buildable areas.
- 2 - Moderate Access: Two utilities adjacent, or all three nearby with limited extensions required.
- 3 - Poor Access: Only one or none adjacent; extensive new corridors required.

Table 5 – Proximity to Utilities Scoring Summary

Site	Score
Gavan Hill	2
Sitka High School	1
Upper Edgecumbe Drive	3
Benchlands	2
Harbor Mountain Road	2
Green Lake Road	3
Herring Cove Peninsula	3
Osprey Street	1

3.2 DENSITY POTENTIAL

The criteria in this category relate to the potential, or lack of potential, for high-density development.

3.2.1 BUILDABLE AREA

Buildable area was evaluated using LiDAR data available from the State Of Alaska Department of Natural Resources Division of Geological & Geophysical Surveys. Buildable area is generally defined as land with slopes less than or equal to 15 percent. Note, LiDAR data may be subject to error, especially in heavily treed regions.

Scores were assigned as follows:

- 1 – More than 25 acres
- 2 – 15–25 acres
- 3 – 5–15 acres
- 4 – 2–5 acres
- 5 – Fewer than 2 acres

Table 6 – Buildable Area Acreage and Scoring Summary

Site	Buildable Area (acres)	Score
Gavan Hill	63.17	1
Sitka High School	7.26	3
Upper Edgecumbe Drive	13.65	3
Benchlands	62.33	1
Harbor Mountain Road	29.33	1
Green Lake Road	77.29	1
Herring Cove Peninsula	0	5
Osprey Street	1.04	5

3.2.2 UTILITY CAPACITY

Utility Capacity is discussed in detail within the Utility Capacity Study (Appendix C). Scores represent estimated capacity of existing water, wastewater, and electrical infrastructure. Each utility was evaluated independently. The average of the scores for each utility was taken to assign an overall composite capacity score for each site.

Scores were assigned as follows:

- 1 – Adequate existing capacity to support buildout; minimal improvements needed.
- 2 – Nearby utilities have capacity, but some improvements/extensions necessary.
- 3 – Nearby utilities have some available capacity, but improvements/extensions required for full buildout.
- 4 – Extensive improvements needed prior to any development.

Table 7 – Utility Capacity Scoring Summary

Site	Score
Gavan Hill	3
Sitka High School	2
Upper Edgecumbe Drive	3
Benchlands	4
Harbor Mountain Road	2
Green Lake Road	4
Herring Cove Peninsula	4
Osprey Street	1

3.2.3 TRANSPORTATION CAPACITY

Transportation capacity was assessed at a planning level to evaluate whether existing roadway geometry, access spacing, and right-of-way conditions could reasonably support additional traffic generated by future residential development. Although Phase I does not include formal traffic modeling or trip generation estimates, comparable residential developments in Sitka typically introduce peak-hour vehicle movements that may necessitate roadway widening, improved sight distances, or the addition of secondary access routes to meet emergency response and fire access standards. These considerations were incorporated into the scoring framework to identify sites where development may require substantial roadway modifications or new access corridors.

Scores were assigned as follows:

- 1 – Adequate existing capacity and right-of-way (ROW); minimal improvements needed.
- 2 – Nearby roads have capacity, but some improvements or extensions are necessary; adequate ROW available.
- 3 – Roadway improvements or extensions needed, but adequate ROW is available.
- 4 – Extensive roadway improvements required; significant new ROW acquisition or widening likely.

Site Specific Scoring for Transportation Capacity

- Gavan Hill: Connected to Charles Street, Pherson Street, and Lake Street. Lake Street ROW would require upgrades from the Peterson Avenue intersection to provide adequate lane widths. Given the size of the anticipated development area, multiple access points will be required to safely distribute traffic and meet emergency access requirements. Transportation Capacity Score: 3

- Sitka High School: Accessed from Bahrt Circle via Charles Street. These residential streets likely provide adequate capacity for a small development; however, density will influence this determination. Some improvements to Bahrt Circle ROW are required to directly serve the buildable area. Transportation Capacity Score: 2
- Upper Edgecumbe Drive: Developable areas are isolated from any existing ROW. Access would require new ROW procurement and internal roadway construction through steep, heavily treed terrain. Charteris Street and Wortman Loop represent potential access points, but at least one additional access is likely needed, potentially from Cascade Creek Road. Transportation Capacity Score: 4
- Benchlands: Served via Kramer Avenue and Harbor Mountain Bypass. Kramer Avenue is not fully constructed to standard but ROW exists along the corridor. Improvements will depend on density but are expected to be moderate. Transportation Capacity Score: 2
- Harbor Mountain Road: The corridor generally has good access via Harbor Mountain Bypass, with adequate ROW to support moderate development. However, required improvements will depend on ultimate density and roadway classification. Transportation Capacity Score: 2
- Indian River: Not evaluated for transportation capacity. Connecting roads such as Indian River Road and access points within Baranof Island Housing Authority developments would need to be considered once land acquisitions decisions are made and density scenarios estimated.
- Green Lake Road: Northern developable pockets connect to Herring Cove Road, which likely has adequate ROW but would require improvements to support increased traffic. Eastern portions of the study area would require blasting and widening to provide safe access. Portions of the area remain undevelopable due to FERC restrictions associated with Green Lake Dam. Transportation Capacity Score: 4
- Herring Cove Peninsula: Connected to Herring Cove Road, which likely has adequate ROW and roadway capacity to support a small development. However, geometric constraints and topography may limit expansion beyond small-scale development. Transportation Capacity Score: 3
- Osprey Street: Existing ROW provides sufficient width and capacity for this small-scale infill development, requiring little to no roadway improvement. Transportation Capacity Score: 1

Table 8 – Transportation Capacity Scoring Summary

Site	Score
Gavan Hill	3
Sitka High School	2
Upper Edgecumbe Drive	4
Benchlands	2
Harbor Mountain Road	2
Green Lake Road	4
Herring Cove Peninsula	3
Osprey Street	1

3.3 DESIRABLE FACTORS

The criteria in this category capture community-oriented considerations that, while less quantifiable and generally lower in direct cost impact, reflect factors of strong public interest and long-term community value. These include environmental sensitivity, cultural resources, recreational connectivity, and proximity to essential services. Although more subjective than constructability or density metrics, these factors play a meaningful role in determining a site's compatibility with community goals and planning priorities.

3.3.1 ENVIRONMENTAL IMPACT

Wetland presence and extent were evaluated through the Wetland Study included in Appendix E, which provides delineation mapping, wetland classifications, and associated permitting implications under Section 404 of the Clean Water Act. Findings from Appendix E were incorporated into Environmental Impact scoring. Sites containing extensive wetlands or hydrologically connected features received less favorable scores due to anticipated permitting complexity, potential impacts to waters of the U.S., and increased likelihood of compensatory mitigation requirements.

In addition to wetlands, this criterion also evaluates potential impacts to cultural and recreational resources, including the Cross Trail, mountain bike trail networks, informal walking routes, and areas of known or suspected cultural significance. Sites intersecting or adjacent to these community assets received less favorable scores where development would require rerouting trails, modifying recreational use patterns, or other cultural resource impacts. Note, no formal cultural resource study was performed during Phase I. Assessments are based on known sites and resources identified by CBS. Future potential permitting efforts associated with residential developments are discussed in Appendix D.

Scores were assigned as follows:

- 1 – Minimal impacts anticipated; limited or no permitting required.
- 2 – Some impacts expected; moderate permitting and mitigation likely.
- 3 – Significant impacts likely; extensive permitting and mitigation required.

Site Specific Scoring for Environmental Impact

- Gavan Hill: Although the site contains extensive buildable area, multiple recreational and cultural assets—including the Cross Trail, mountain bike trails, Peterson Creek, and old growth forest—are present. Wetlands are also identified within the parcel, and compensatory mitigation would likely be necessary. Environmental Impact Score: 3
- Sitka High School: Only minor wetlands located in low-lying areas appear to be affected. Known cultural and recreational impacts are minimal. Environmental Impact Score: 1
- Upper Edgecumbe Drive: The Cross Trail borders the site and would likely require relocation to support development. Old growth forest is present throughout the parcel and wetlands are likely present. Environmental Impact Score: 2
- Benchlands: As a historically platted area, limited cultural resource impacts are anticipated. Portions of the area serve as informal walking routes and overlap with the Cross Trail, requiring integration into any future development plans. Wetlands are present and would likely require compensatory mitigation. Environmental Impact Score: 2
- Harbor Mountain Road: Minimal cultural resource impacts are expected. The site includes a segment of the Cross Trail system. Significant wetland coverage is present throughout the developable area, and mitigation requirements would be substantial. Environmental Impact Score: 3

- Indian River: Road development through the parcel must consider significant wetland prevalence and proximity to Indian River, and anadromous water body.
- Green Lake Road and Herring Cove Peninsula: The primary development potential lies near the Beaver Lake trailhead, which includes an anadromous stream. Much of the study area remains unavailable for development due to FERC restrictions associated with the Green Lake Dam and associated inundation zone. Environmental Impact Score: 3
- Osprey Street: As an urban infill parcel surrounded by existing development, minimal environmental or cultural impacts are anticipated. Environmental Impact Score: 1

Table 9 – Environmental Impact Scoring Summary

Site	Score
Gavan Hill	3
Sitka High School	1
Upper Edgecumbe Drive	2
Benchlands	2
Harbor Mountain Road	3
Green Lake Road	3
Herring Cove Peninsula	3
Osprey Street	1

3.3.2 PROXIMITY TO HUMAN SERVICES

This criterion evaluates the site's proximity to key services such as healthcare, schools, commercial areas, and transit access. Accessibility influences long-term livability, transportation demand, and compatibility with existing urban development patterns.

Scores were assigned as follows:

- 1 – Walkable to most services and downtown areas.
- 2 – Near services and/or readily accessible via public transportation.
- 3 – Distant from services and/or dependent on private vehicle transportation.

Table 10 – Proximity to Human Services Scoring Summary

Site	Score
Gavan Hill	1
Sitka High School	1
Upper Edgecumbe Drive	1
Benchlands	2
Harbor Mountain Road	2
Green Lake Road	3
Herring Cove Peninsula	3
Osprey Street	1

3.4 OVERALL DECISION MATRIX SCORING

The individual criterion scores above were normalized and weighted within the Decision Matrix using the MCDA method. Weights were established in coordination with the CBS Planning Department and Planning Commission. Detailed scoring methodology and weighting values are presented in Appendix F, and the full Decision Matrix is provided in Appendix G.

Table 11 - Overall Decision Matrix Scores and Ranking

		Decision Matrix Input Scores									
Final Rank	**Site**	Slide Risk Factors	Construction Access	Physical Conditions	Proximity to Utilities	Buildable Area	Utility Capacity	Transportation Capacity	Environmental Impact	Proximity to Services	**Final Decision Matrix Weighted Output Score**
1	**Osprey Street**	1	1	1	1	5	1	1	1	1	**90.00**
2	**Sitka High School**	1	1	2	1	3	2	2	1	1	**71.67**
3	**Benchlands**	3	1	2	2	1	4	2	2	2	**55.42**
4	**Harbor Mountain Road**	2	2	3	2	1	2	2	3	2	**53.25**
5	**Gavan Hill**	2	2	2	2	1	3	3	3	1	**52.58**
6	**Green Lake Road**	3	2	3	3	1	4	4	3	3	**41.67**
7	**Herring Cove Peninsula**	2	2	3	3	5	4	3	3	3	**35.83**
8	**Upper Edgecumbe Drive**	3	3	3	3	3	3	4	2	1	**34.33**

4. NEXT STEPS AND RECOMMENDATIONS

The objective of this project is to determine the feasibility and ultimately estimate the cost to develop areas of CBS-owned land for residential housing. Recognizing that comprehensive engineering analysis of all sites is cost-prohibitive, the project approach is intentionally structured to eliminate unsuitable sites through progressively more detailed evaluation phases.

Based on Phase I scoring, PND recommends removing the lowest-ranked sites from further consideration, including: - Green Lake Road - Upper Edgecumbe Drive - Herring Cove Peninsula

Indian River was removed from consideration pending additional guidance regarding potential acquisition of Alaska DNR land north of the subject parcels.

Sites ranking 1 through 5 are considered viable candidates for further feasibility refinement. Recommended site-specific next steps are summarized below.

Table 12 - Next Steps for Phase II Study Sites

Rank	Site	Recommended Next Steps
1	Osprey Street	• Density determination - coordination with CBS on development scenarios. • Detailed topographic and boundary survey. • Preliminary subdivision layout and plat development.
2	Sitka High School	• Density determinations. • Preliminary subdivision layout. • Confirm water/wastewater capacity and needed upgrades based on preferred density and layout, coordinate with CBS fire and building departments. • Environmental Permitting.
3	Benchlands	• Landslide / debris flow analysis and mitigation study to refine. developable areas and feasibility. • Preliminary lot layout to support debris flow mitigation study.
4	Harbor Mountain Road	• Hydrologic and hydraulic study (including downstream drainage analysis). • Landslide and debris flow analysis and mitigation study. • Preliminary lot layouts to support drainage and debris flow mitigation studies. • Confirm utility capacities and necessary upgrades based on preferred density and layout.
5	Gavan Hill	• Density determinations. • Preliminary lot layouts to support confirmation of utility capacity assumptions and debris flow impacts. • Confirm utility capacities based on preferred density and layout. • Confirm minimal landslide debris flow impacts to planned development layout. • Hydrologic and hydraulic study with flood determinations. • Trip generation and transportation impact study.

The recommended steps above include studies that may significantly influence the feasibility of development for each site. An additional important consideration is overall development cost. CBS should consider the point at which projected construction costs may preclude further evaluation.

As an alternative approach, CBS may elect to develop preliminary subdivision layouts and rough order-of-magnitude (ROM) cost estimates for the remaining high-ranking sites prior to committing to detailed technical studies. It is anticipated that development costs will vary substantially between sites due to differences in utility infrastructure requirements, access constraints, terrain modification needs, and mitigation measures. Incorporating high-level cost sensitivity analysis during Phase II may assist CBS in identifying cost thresholds beyond which further site evaluation becomes economically impractical. While ROM estimates would carry a higher degree of uncertainty, they may provide sufficient information to assist with strategic site elimination and prioritization decisions without committing to higher-cost investigations prematurely.

5. CONCLUSION

Phase I of the City and Borough of Sitka's Land Suitability and Feasibility Study provides a structured, defensible comparison of nine municipally owned parcels with potential for future residential development. Through a Multi-Criteria Decision Analysis (MCDA) framework supported by buildable area assessments, hazard screening, wetland review, transportation considerations, and the Utility Capacity Study, the Phase I effort establishes a clear basis for identifying higher-priority sites.

Phase I evaluations are cursory and intended for feasibility screening only, relying on existing datasets and high-level analyses. These methods are appropriate for comparative ranking, but more detailed investigations will be required before development concepts or cost estimates can be refined.

The results of Phase I highlight several promising sites—most notably Osprey Street, Sitka High School, Gavan Hill, Benchlands, and Harbor Mountain Road—while identifying others with constraints significant enough to limit near-term feasibility. Advancing the higher-ranking sites into Phase II will allow CBS to complete targeted technical studies, refine density scenarios, develop preliminary layouts, and better define infrastructure needs.

Phase I serves as a decision-support foundation, helping CBS prioritize where to focus resources in future phases as it works to expand residential housing opportunities within the community.

Conclusions of this report are based on known conditions and preliminary engineering analyses. Recommendations may change as the project progresses and additional information becomes available.

Appendix A. Site Visit Report – December 2024

CBS Land Suitability and Feasibility Study
Site Visit Report

PND No. 242091

The City and Borough of Sitka (CBS) has undertaken a project to study municipal land throughout the Borough to determine the feasibility of constructing residential housing on municipally owned parcels. PND Engineers Inc. (PND) is providing engineering services in support of this effort. The project will be conducted in phases, with the results of earlier phases determining the scope of subsequent phases. Phase I consists of a project kickoff, study area site visits and initial scoping effort, followed by preliminary selection of sites to take forward into further study and additional phases. This report summarizes the preliminary site visits to the study areas performed by PND. PND's Project Manager Tyler Bradshaw and Geotechnical Engineer Cameron Klatt visited Sitka on December 5 and 6, 2024. The site visit consisted of:

1. **Kick off Meeting on December 5, 2024, 10:00AM at the Jarvis Conference Room, Sitka AK**

   Attendees:

Amy Ainslie (AA)	CBS	Kord Christianson (KC)	CBS
Kim Davis (KD)	CBS	Joe Swain (JS)	CBS
Michael Harmon (MH)	CBS	Tyler Bradshaw (TB)	PND
Ron Vinson (RV)	CBS	Cameron Klatt (CK)	PND
Tony Bird (TB)	CBS		

2. **Site Visits to the study areas on December 5 – 6, 2024.** Attendees included TB, CK, KD. AA also attended several properties. Notes on study area maps are attached to this report. Site photos have also been included.

3. **Debrief Meeting following site visits on December 6, 2024.** Attendees included TB, CK, AA, KD

The following topics were discussed throughout the visit.

DISCUSSION ITEMS:

1. PRELIMINARY
   a. Study description, intent and goals.
      i. Study municipal land to determine the feasibility to construct residential housing.
      ii. Use decision matrix to narrow sites for further investigations and ultimately concept design.

   b. Goals for the meeting and field visits.
      i. Input on areas from stakeholders to guide site visit and future investigations.
      ii. Collect preliminary data.
      iii. Begin to establish selection criteria and weight for decision matrix.

2. STAKEHOLDER OBJECTIVES AND PRIORITIES DISCUSSION

   a. Focus on the technical, less on the social, political and community processes.

   b. It has been costly for CBS when new developments aren't completely finished during the initial construction phase (for example, a road is built, but CBS is left with unfinished infrastructure such as sidewalks, cross walks, lighting, and/or signage). It is cheaper in the long run to get everything constructed at once rather than completing small, additional projects after the majority of a development is complete. The tradeoff here is that more money is required initially in order to get everything done at once.

   c. Ideally, new developments will consider city planning goals that reach far into the future. It's important to have input from all sectors of CBS to ensure this happens. Is there a desire/possibility for long-term growth opportunities in a given area? How can THIS stage of new development make the next stage cheaper and easier?

   d. The utility easements that are required to facilitate a given development (existing or to be obtained) are critical considerations. Substations should be located in strategic areas so that we get the most out of any given utility expansion/improvement.

   e. We always need to have the following question in the back of our minds: what overall impact will a given stormwater/sewage/general drainage project have on the overall system that is already in place? A big part of a given project's success is how successfully it ties in to the existing CBS infrastructure and operations and maintenance plan.

   f. Ensuring a thorough project closeout process is very important to CBS. All projects should ideally conclude with complete as-built information, GIS files, and a clear understanding of who will be maintaining and operating the new infrastructure. Need to consider whether or not new developments can be supported by the current CBS staff.

   g. Many of the areas that are available for development have significant topography and may present an opportunity to use gravity to our advantage. This should be exploited whenever possible because the lifetime costs of utilities will be much less if we can minimize the use of pumps.

   h. Lift station capacities are very important to consider—especially when we are considering long-term planning objectives. Consider existing pipe networks, lift stations, and the available capacity that the systems have remaining. This is one aspect of the decision criteria that cannot be judged by visual observations made above ground so it is understood that a certain level of analysis will be required.

   i. In general, CBS prefers for all new housing developments to be part of the public water and sewer system rather than on individual well and septic. The only exception to this preference may be at isolated housing opportunities toward Green Lake. Required well and septic offsets likely limit the practicality of this at all potential locations.

   j. The primary goal of this stage is to narrow down the potential sites that should be looked more closely from a physical/ technical perspective. We shouldn't be concerned with how the development of each site may make people feel. Determine the best place from an objective, constructability, standpoint.

3. SITES REVIEW – Also see attached site visit notes on maps.

   a. Gavan Hill

      i. Any property built in this area needs to be looked at from a landslide safety point of view. Need to get access to the CBS-commissioned landslide study that was performed.

      ii. CBS mentioned a large stand of old growth trees located on the eastern edge of the parcel that needs to be left in place. It is understood that the forest service has previously mapped these trees. PND needs to verify the location of these trees if the Gavan Hill area is identified as an advantageous site to develop during the initial stage of this project.

      iii. Joe Swain mentioned that connecting water utilities to the southeast portion of the parcel would not be an issue.

iv. Connecting the remaining areas of Gavan Hill may be more challenging due to the valleys located along the Cross Trail. A review of existing LiDAR data to identify the locations of the valleys and other topographical challenges.

v. Old Kimsham Landfill is adjacent to this property and needs to be kept in mind.

vi. No major concerns for connecting this area to electric grid.

b. Gavan-SHS

i. Potential for high density housing in this area.

ii. Adding housing here would increase the traffic in the vicinity of SHS significantly. Need to consider additional access points to the property.

iii. Undeveloped right of way to the east of the parcel that could connect the property to Bahrt Circle. The R.O.W. appears pretty narrow from initial observations, but may represent a good secondary access to this area.

iv. May also be able to add on to Lake Street Extension to provide access to this site from the north side of SHS. There is an anadromous stream that would likely need to be crossed in order to make this a viable access route (Figure 1).

Figure 1: Potential site access routes to Gavan-SHS parcel

v. No major issues for connecting utilities for this area, but we need to assess if the existing utilities have enough remaining capacity for whatever the proposed development ends up being.

vi. There is a 6-inch water line on Verstovia Avenue (plan south of parcel) that should have plenty of remaining capacity.

vii. May be able to add some of the SHS property to this parcel to increase the developable area.

viii. Likely some existing subsurface data from the construction documents for the PAC located just north of SHS.

c. Gavan Extended

i. Cross Trail runs through this parcel. Theres an old water line that came from cascade creek. Theres an easement for this but the water line is abandoned.

ii. MH mentioned getting water from the Whitcomb Pressure Zone to Edgecumbe Drive.

iii. Development currently in discussion between the Whitcomb water tank and Cascade Creek that the Mental Health Company had planned out. Plan was to tie into tank so that the higher elevation parcels in this area could get off of the pump stations and get access to gravity fed water from the tank. U.S. Forest now controls this land so there's a road block to this plan, but it isn't off the table. CBS needs to consider this when developing future plans, but it is currently off the table and does not need to be considered with this study.

iv. Any development through the U.S. Forest owned land between the Whitcomb Tank and Cascade Creek would require easements.

v. There is an area within this parcel that has been identified as being low risk with respect to landslides. Need to review the source of this study and potentially focus on development in this area (Figure 2).

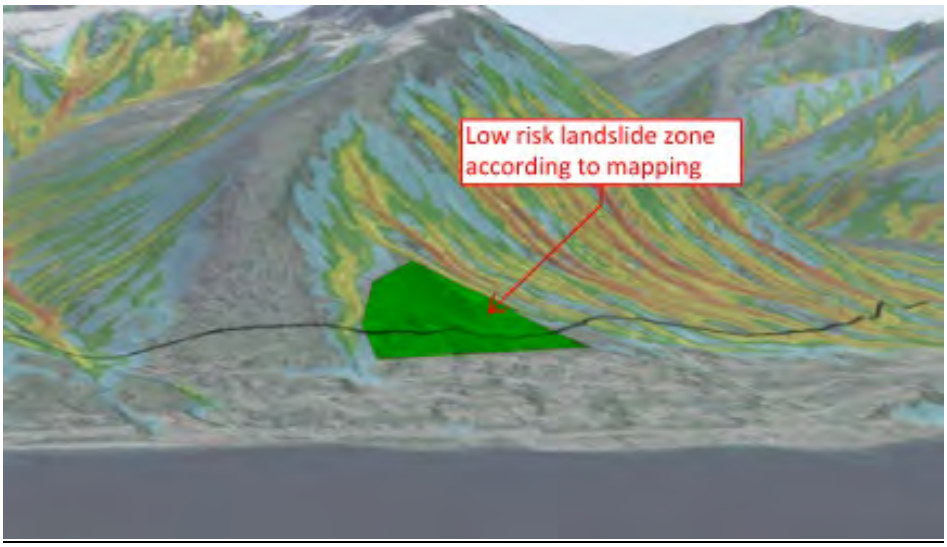


Figure 2: Area identified as having low risk of landslide inundation on Gavan Hill parcel

d. Benchlands

i. Extending utilities along Halibut Point Road (HPR) was highlighted as a limitation to developing along the benchlands during the meeting.

ii. CBS would like all future utilities to be underground as much as possible.

iii. There is an area that is reserved for a substation on the south side of the Benchlands. CBS is going to follow up with PND about this so that we are clear about where the reserved land is located.

iv. CBS wants to plan for a 69 KVA transmission line on the Benchlands that would be along Kramer Avenue. Need to keep in mind the relationship between transmission capacities and required burial depths.

v. Based on preliminary observations and the available data, PND believes that future development should be limited to the southern side of Kramer Avenue. Doing so certainly does not eliminate the risk of potentially catastrophic landslide damage, but it will reduce likelihood significantly.

vi. Future landslides are likely to continue to occur upslope of Harbor Mountain Bypass Road and Kramer Avenue and there does not appear to be a feasible way to eliminate their occurrence. Instead, measures could be taken to divert and/or block landslides from reaching new developments in the Benchlands.

vii. One potential means of protecting new developments would be to bench in a new embankment upslope of the currently platted properties in the benchlands before building up a large embankment that is capable of stopping significant volumes of debris flows. The height and geometry of such an embankment is not known at this time but would likely need to sit well above the existing terrain in order to effectively block debris and provide enough storage of material.

viii. Expansion and continuous maintenance of the Landslide Warning System in Sitka would also be beneficial from a life safety point of view.

e. Harbor Mountain Bypass Road.

i. In general, all land that is on the upslope (east) side of Harbor Mountain Bypass Road is too steep for feasible development and it also has a higher potential for landslide inundation relative to the downslope areas.

ii. Biggest concern for the available parcel between Halibut Point Road and Harbor Mountain Bypass Road are the presence of wetlands and the potential for landslide inundation.

iii. During site reconnaissance, there were multiple localized areas with high ground that may not actually be wetlands. It may be worthwhile to perform a detailed wetland delineation study in this area if the site is identified as advantageous during this first phase.

iv. Areas in Figure 3 were preliminarily identified as having highest potential with the parcel based on topography, vicinity to existing roads and utilities, and distance from runout zones of previous landslides on Harbor Mountain.

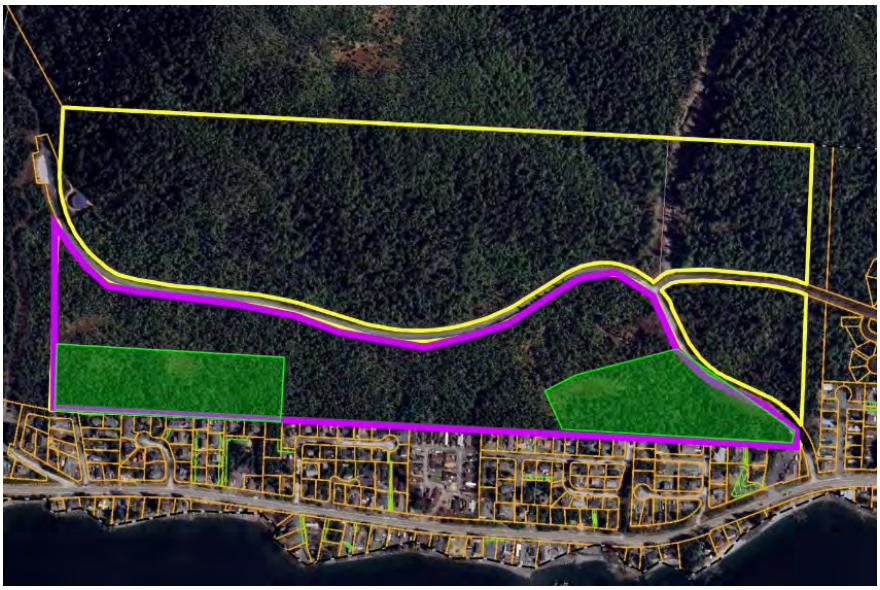


Figure 3: Primary areas of interest in Harbor Mountain parcel based on preliminary site reconnaissance

v. Potential access point to shaded area in the left in Figure 3 near the existing cell tower. Re-development of the Old Harbor Mountain Road represents an opportunity for relatively cheap road construction.

vi. Very limited probing above Channel Club indicated 2 to 4 feet of very soft surficial muskeg underlain by denser soil is this area.

f. Indian River

i. L-shaped parcel is no longer up for consideration because it is no longer U.S. Forest Service administrative land. The land could, however, still be used for access to DNR land to the north.

ii. Planning commission and assembly is likely to have input moving forward as to how much time we should spend focusing on DNR land.

iii. There is an old water plant located at the end of Indian River Road. Joe mentioned that it may be demolished in the coming years because the water isn't potable and requires filtration.

1. One nice thing about the old plant is that it represents a viable backup water source for CBS.

iv. Primary interest with this area is using it for access to state lands that are further north.

v. After site reconnaissance, it appears that any road development would be constrained by land ownership conflicts with BIHA land, U.S. Forest Service lands, and river flood plain.

vi. Relatively easy to develop from an electrical point of view according to Tony.

vii. Running utilities back here would likely a challenge due to the abundance of muskeg in the flat, developable areas. Bridges and/or culverts crossing anadromous streams would also make this area expensive to develop.

g. Green Lake Road

i. At locations near and beyond Herring Cove, all future structural foundations should be at least 25 feet above MLLW in order to prevent inundation by waves that could result failures of the Green Lake Dam. This is a good starting point, but the minimum elevation could and should be refined if a study ever takes place to better answer this question. The reason that this is a big deal is because if a housing development is completed and it's determined that inundation could take place, the dam could have to be retrofitted which would be very expensive.

ii. There is plenty of capacity with respect to electrical along Green Lake Road due to its vicinity to the electrical plant and the current lack of demand for electricity in the area.

iii. Furthest lift station in this direction is next to Silver Bay Seafoods. JS thinks that the lines/lift stations out this way are near capacity during the summer, but have extra capacity during the off seasons.

iv. There are future developments in the works out in this direction (BIHA subdivision, GPIP expansion, and potential UAS subdivision were all mentioned in the meeting). The extra demand on utilities from all of these potential developments need to be considered when looking at available utility capacities.

v. The road past Herring Cove isn't paved so the cost to trench and install a utilidor wouldn't include repaving. May need to rip or blast rock in though.

vi. Based on conversations with Amy, it was concluded that we should not consider any housing developments beyond the hatchery at this time. The road is generally very narrow past the hatchery so drilling and blasting would be required in order to consistently have a two-lane road that is up to code.

vii. There are multiple small, disconnected areas of land along Green Lake Road that have potential because they are flat. In order for the development cost to be reasonable, however, they would probably have to be on individual well and septic. Establishing connection to the electricity grid does not pose any major issues in this area.

h. Herring Cove Peninsula

i. Most people in meeting don't think this Herring Cove Peninsula is buildable due to very rough topography. This is especially the case on the ocean side of Sitka Highway near the peninsula.

ii. There is pressure to at least look at this place objectively even though it doesn't seem viable.

iii. Drove by the site, but did not get out and look at the area thoroughly.

i. Osprey Street (Added during meeting).
    i. Potential for easy development along existing Blatchley Middle School Baseball Field fence. Would be relatively easy to connect to existing utilities, it's centrally located, and could service all ages of the community based on its close location to the city center and easy access.
    ii. Area that would be relatively easy to develop is approximately 0.5 acres. Parking areas along Osprey Street are limited so this area is unlikely to support multi-unit housing complexes. Single family homes likely represent the best opportunity for this location.
    iii. Had a discussion with KD about repurposing the Blatchley Middle School Baseball Field area for housing. If this were possible, development area along Osprey Street would increase.

4. DECISION MATRIX CRITERIA - These criteria were discussed at the Kickoff meeting. Also see Item 5.c below for follow up discussion at debrief meeting.
    a. General topography/ geophysical concerns
    b. Constructability/ access
    c. Parcel size, shape/ density potential
    d. Development scenarios/ targets
    e. Proximity to utilities
    f. Access/impacts to services, (schools, trash, mail, emergency)
        i. Should be thinking about who a given development is servicing and how effective/safe the development is. For example, senior housing should ideally be close to grocery stores and streets with family housing should have clearly defined sidewalks or pedestrian corridors.
    g. Potential public support/ resistance.
        i. Amy's thought is to stay away from this as a decision criterion because right now we are looking at sites from an objective constructability and cost point of view, not how the public is likely to respond.
    h. Potential impacts to surrounding properties/ landowners.
    i. Potential impacts to landscape/environment
        i. Permitting requirements are very significant if wetlands will be filled.

5. OPEN DISCUSSION / ADDITIONAL ITEMS
    a. While discussing the potential for development along Green Lake Road, MH mentioned that development along Halibut Point Road should also be open for discussion if we're looking at Green Lake Road. He believes this land would be more desirable because there are flat locations and the land is suitable for individual well and septic systems. "Really good water and well potential near Star-Gavin…. more attractive for development costs…enough high-quality water out here to support the entire town". Getting electricity to any development near Halibut Point Road is likely the largest restriction from a development cost point of view.
    b. Order of importance for housing developments according to Amy:
        i. Family housing,
            1. Single Family homes
            2. High density family housing
            3. Opportunities for first time home buyers.
        ii. Senior housing,
            1. Providing senior, community housing options may open up single family homes.
            2. Cottage style communities may be option.

iii. Seasonal work force.
1. Dormitory/bunkhouse style
2. April – October is highest need.
3. Charter industry housing

c. Matrix Criteria Discussed During Debrief with AA and KD on 12/6/2024.
i. Constructability
1. Topography/landslide risk
2. Access
3. Geotech/soils
4. Proximity to Utilities
ii. Density Potential
1. Buildable area
2. Utility capacity
3. Transportation capacity
iii. Desirability
1. Environmental impact
2. Proximity to services
3. Potential to unlock future developments

d. PND met with Pat Swedeen regarding an unmapped flood zone which included portions of the Gavan Hill and SHS areas. Reportedly these areas were not mapped by FEMA due to unknown flood impacts of Peterson Creek. Pat noted that a Hydrological Study would be needed to map the area. Pat noted that the unmapped designation may be an obstacle to financing homes in this area.

e. AA indicated that utilities should be better understood prior to first pass at decision matrix. It is understood that comprehensive utility capacity analyses are not currently in the budget for this phase. A second task order is needed to increase the scope of the phase I investigations for utility and transportation capacity.

6. <u>DATA REQUEST</u>

a. Existing Reports/Documentation to be Shared By CBS
i. SHS and PAC geotechnical data.
ii. CBS and/or forest service-commissioned landslide study for Gavan Hill.
iii. Green Lake Dam break inundation study.
iv. All existing LiDAR data
v. Old growth tree location near SHS properties.
vi. Benchlands Substation reserved land area.
vii. As-builts for subject parcels and/or nearby developments.

b. GIS
i. Property boundary and utilities GIS data for the subject properties

c. Planning documents related to subject areas as available.

d. List of any additional Stakeholders/ Sources of Information

e. Benchlands Property owner interested in participating in landslide mitigations study contact.

7. PROJECT TASKS
    a. **Phase I – Scoping - Current**
        i. Sites visits and report
        ii. Preliminary research and data gathering
            1. Per Amy, additional information and study should be completed on utility impacts and capacities before using decision matrix to narrow down site options. Also see Item 5. e
        iii. Preliminary decision matrix and sites selection
        iv. Planning Commission Report – TBD
    b. Phase II – Investigations - **Future**
        i. Comprehensive research and data gathering
        ii. Desktop Assessments and Field Investigations
        iii. Reporting
    c. Phase III **-** Data synthesis and Analysis - **Future**
        i. Amend decision matrix
        ii. Determine parcels and development scenarios for concepts
    d. Phase IV – Concepts Design and Cost Estimating -**Future**
        i. Develop concepts and costs
        ii. Amend Decision Matrix with Cost Criteria
    e. Phase V – Finalization -**Future**
        i. Project report and recommendations
        ii. Assembly/Planning Commission presentations

Next Steps	
Task	**Estimated Complete**
CBS Provide Data Request Items	3/14/25
PND additional data collection, H&H, Env. Wetlands, Geotech	3/14/25
Preliminary utilities review and fee estimate	3/14/25
NTP 2	3/21/25
Utilities Study/ Preliminary review of Geotech/ H&H, Environmental	5/1/25
Phase 1 Report and Decision Matrix 1	6/1/25

8. ATTACHMENTS
    a. Site Maps with notes
    b. Photos, Zip file.

11/13 scoping meeting notes - AA, KD, TB SS

12/5 Sitka Stakeholder Meeting notes

12/5-12/6 Sitka Site visit observations/notes

Land Suitability and Feasibility Study

Potential Study Sites

Project primary objectives are feasibility of land itself to be developed for housing, access, utilities topo etc. Political and community processes should be secondary; not included in first stage of evaluation. May just be listed as potential concerns.

City could be developer of sites. Potentially subsidize in public private partnership for affordable housing.

May consider selling some lots/areas at market price in order to fund affordable housing in other areas.

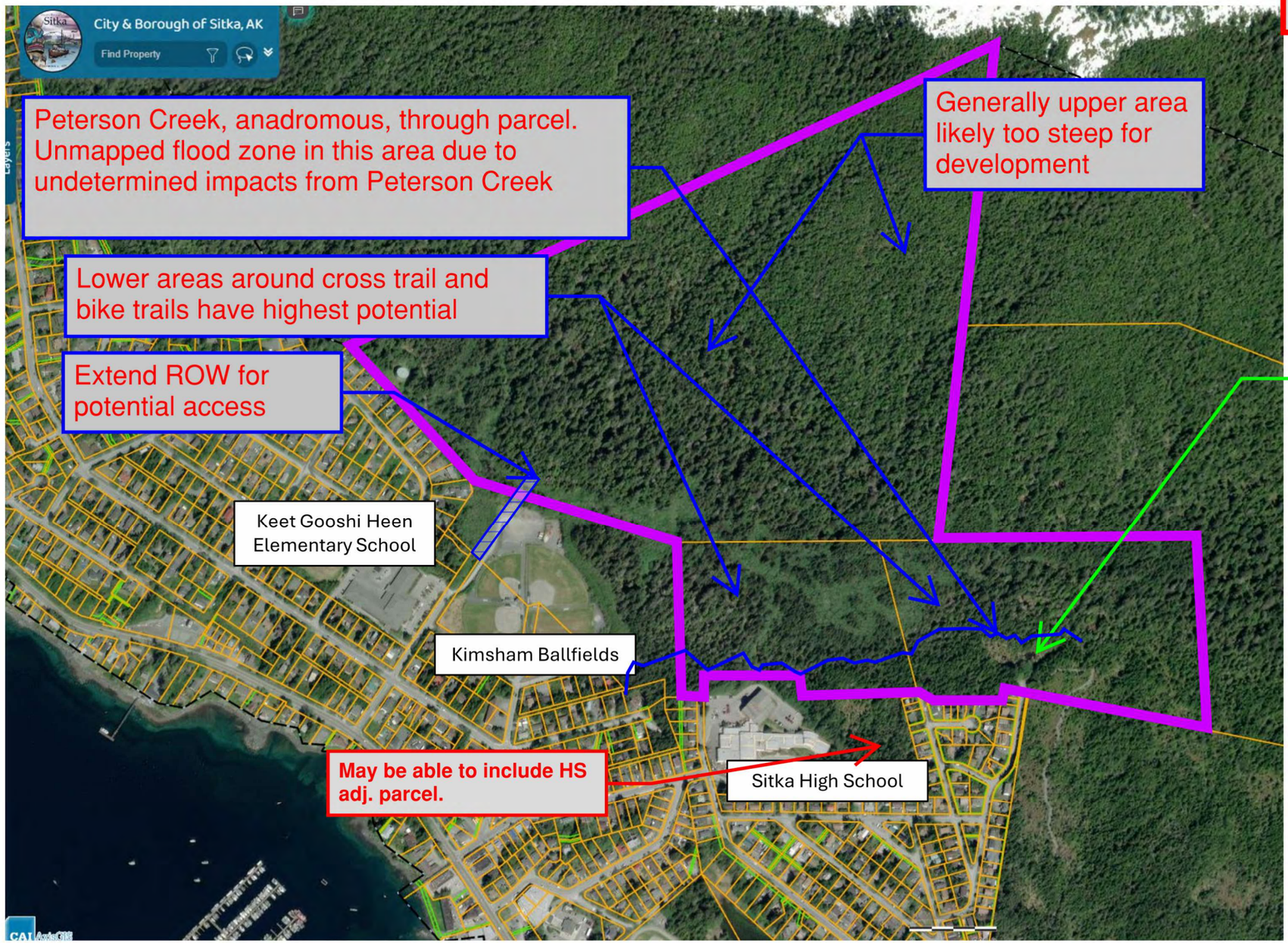
Study should focus on how much housing and for what cost in each area.

The following Areas of Interest are provided to highlight the potential study sites currently under consideration. This is not an exhaustive list of all lands which may or may not be developed.

Additional information is available on the CBS GIS site which can be accessed via:

Area of Interest: Gavan Hill

1. Highest potential, more focused on smaller lots by HS, hillside may not be developable.
2. Cross trail through site.
3. Sitka trailworks will likely have input. Ben Huey receptive to development ideas.
4. Cross trail impacts and potential reconfiguration needs consideration.



Parcel IDs

3-0280-000
1-8600-000
1-8650-000

Abbr. Legal Descriptions:

- Lot 2, US Survey 3858
- Unsubdivided remainder of US Survey 2691

Gavan Hill – SHS Property

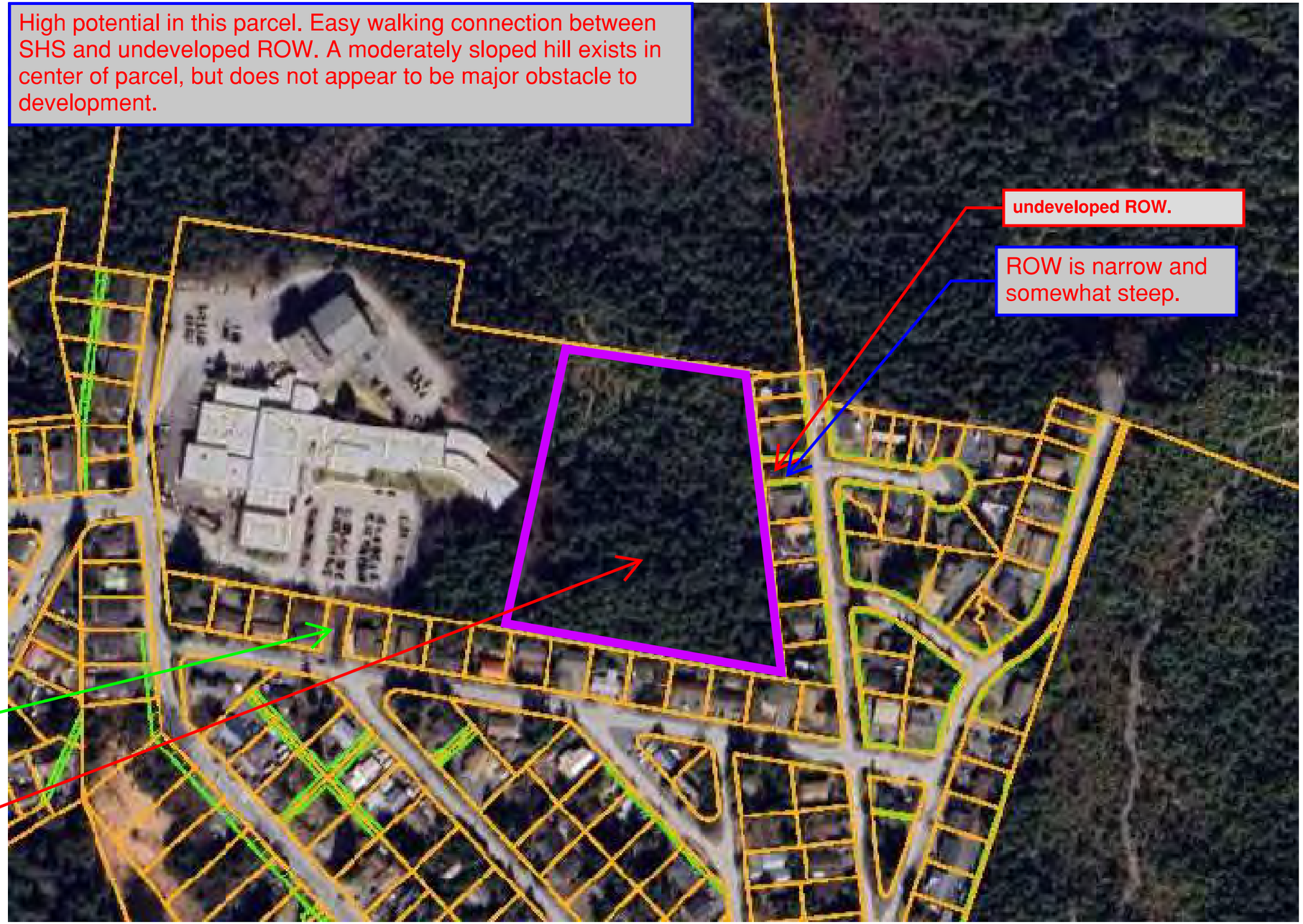
View this property as potential for higher density, bunk house style. Seasonal workforce housing. Perhaps used by SHS during school year to allow for year-round uses. Team housing for sports DDF etc.

Potential Senior Housing.
Potential High density housing.

High School water service.

secondary criteria, SHS uses of property.

High potential in this parcel. Easy walking connection between SHS and undeveloped ROW. A moderately sloped hill exists in center of parcel, but does not appear to be major obstacle to development.



Gavan Hill - Extended

1. Cross trail
2. elevation, steep terrain.

Easement exists for abandoned waterline.
May need to upgrade booster station if additional services are added.

Cross Trail

EDGECUMBE DRIVE

CHARTERIS STREET

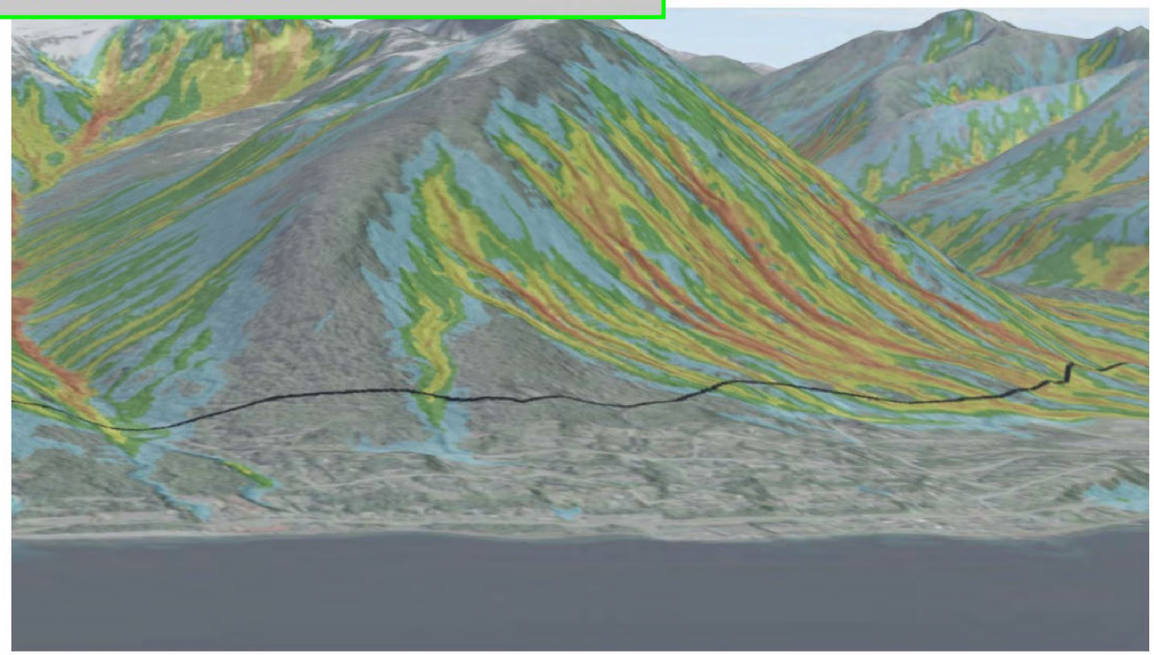
"Pockets" of development along Cross Trail area may be possible

Shaded areas flatten out below steeper hillside. May be room for development with a green strip for landslide clearance against base of Gavan Hill

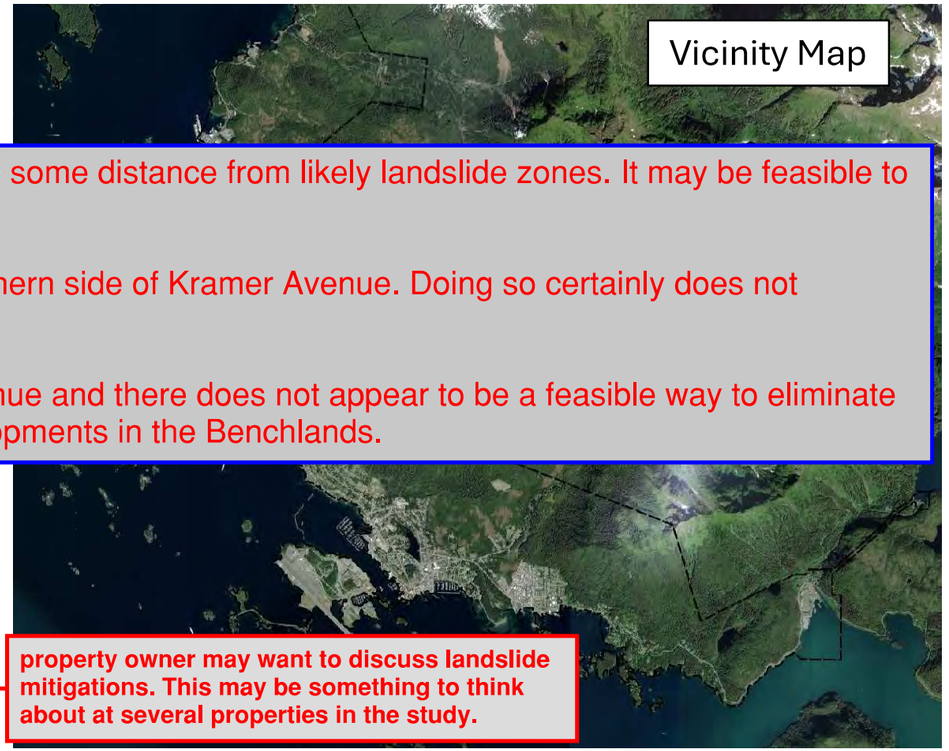
Development was planned in this area, but do not need to consider with study.

Whitcomb Water Tank

Wortman booster station, old, needs upgraded. Water master plan removes this area from booster and connects to Whitcomb tank.



Area of Interest: The Benchlands



1. Parcels backed up against hillside seem to pose risk, areas below roadway are more promising and provide some distance from likely landslide zones. It may be feasible to move roadway nearer the hillside and dual purpose as landslide barrier opening more area to housing.

2. Based on preliminary observations and the available data, future development should be limited to the southern side of Kramer Avenue. Doing so certainly does not eliminate the risk of potentially catastrophic landslide damage, but it will reduce likelihood significantly.

3. Future landslides are likely to continue to occur upslope of Harbor Mountain Bypass Road and Kramer Avenue and there does not appear to be a feasible way to eliminate their occurrence. Instead, measures could be taken to divert and/or block landslides from reaching new developments in the Benchlands.

property owner may want to discuss landslide mitigations. This may be something to think about at several properties in the study.

Study needs to definitively tell us whether the bench lands should still be considered.

Could be developed in "pockets" of safe areas.

Existing subdivision layouts/lots could be changed.

Site has roads and water tower. May have high development potential aside from landslide consideration.

2016 SW landslide report did not cover this area.

Landslide mitigation systems analysis, memo may be warranted if site has high development potential considering other factors. (also consider for other sites with landslide considerations). Consider cost benefit of mitigations vs development benefits.

Electric prefers underground, applies to all sites. General policy.

Electric master plan includes transmission line through Kramer Ave.

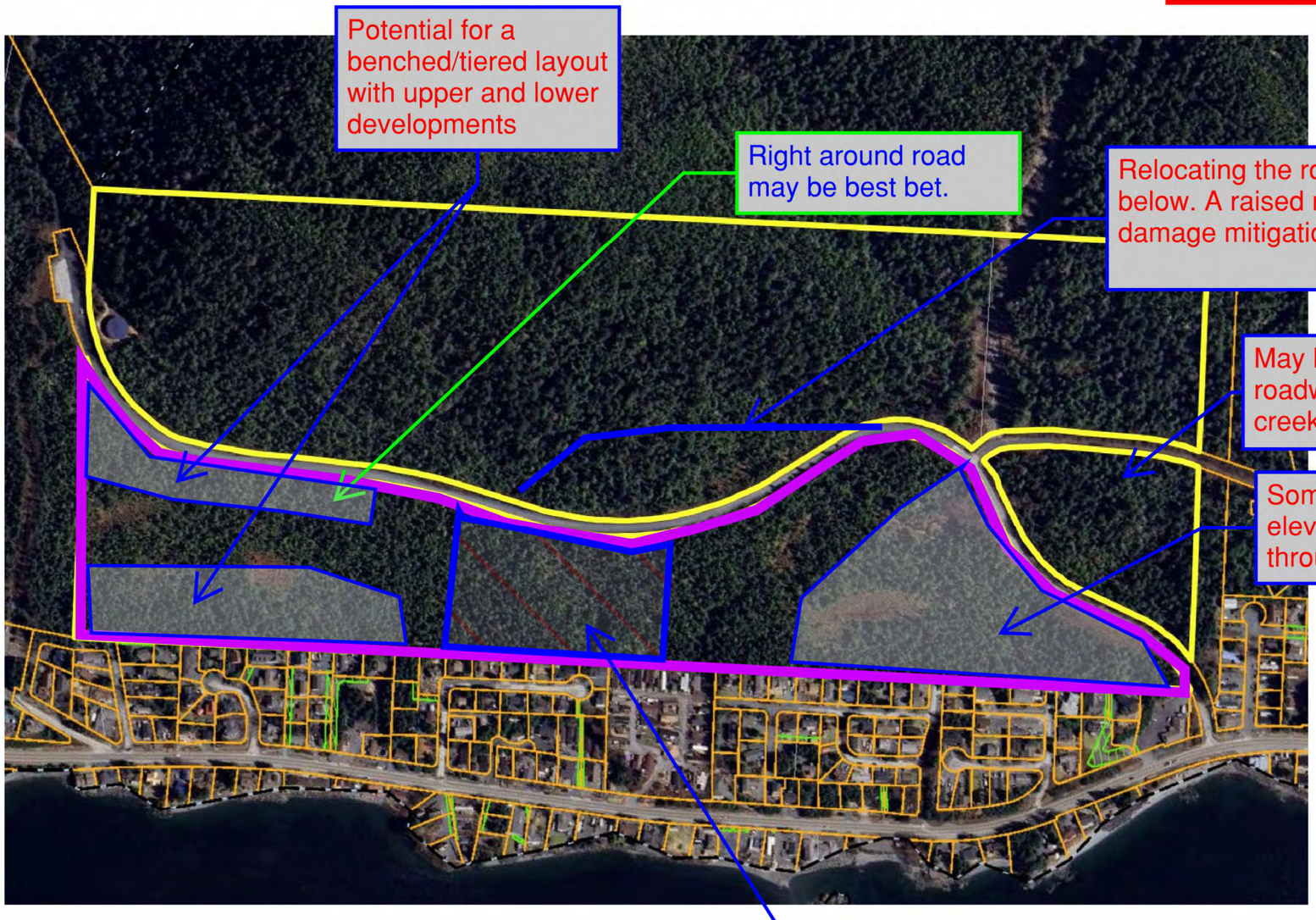
anything out HPR is more difficult for electrical in terms of overall capacity.

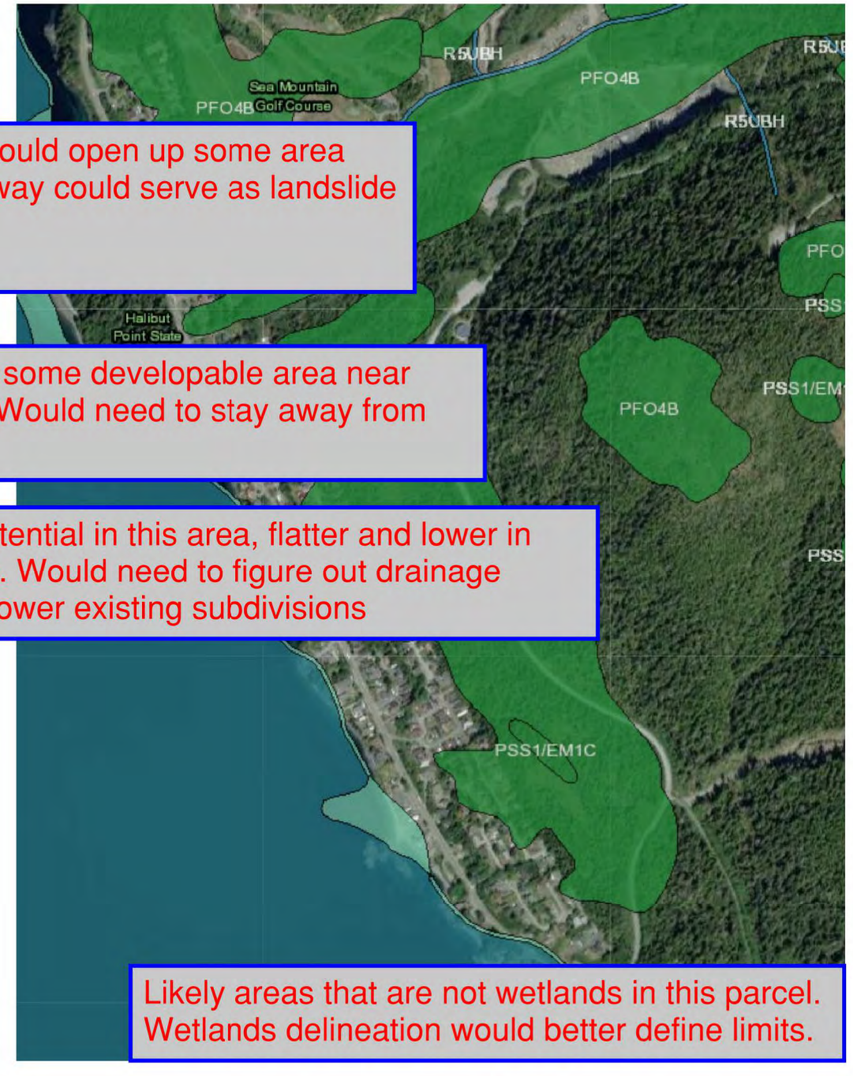
Harbor Mountain Road

Good sized property with road and water tower, but wetlands is a concern.

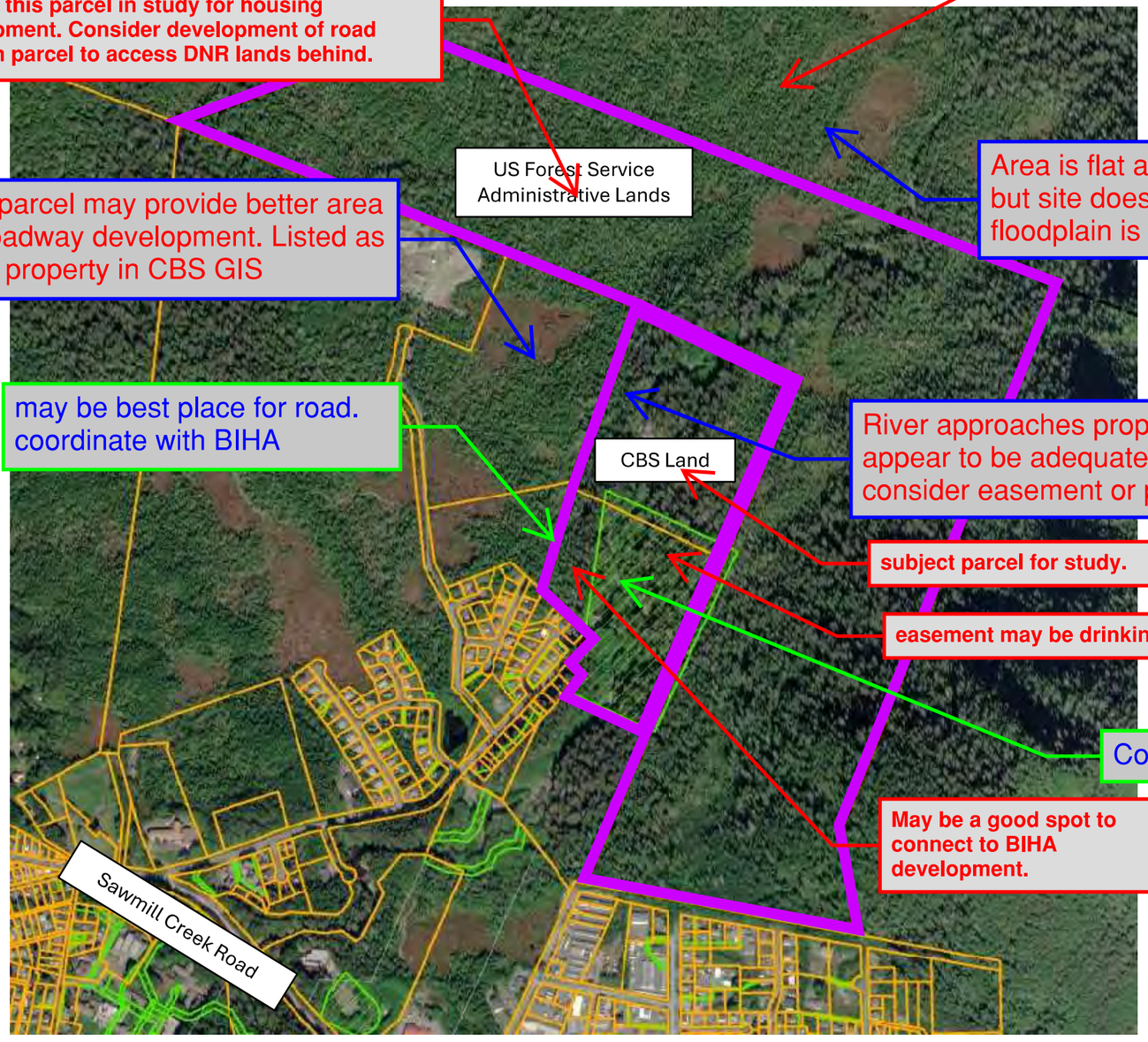
Drainage a concern with developments beneath.

Utilities may be challenging.





Area of Interest: Indian River



Incorrect, this is tongass national forest. Do not include this parcel in study for housing development. Consider development of road through parcel to access DNR lands behind.

State of Alaska DNR land, CBS attempting to procure some of it.

This site would be best access to DNR property behind. Its ability to support access and utilities to DNR land may be important.

This area was reviewed for an access road through to DNR land. Generally a roadway seems feasible. Wetland considerations throughout.

This parcel may provide better area for roadway development. Listed as DNR property in CBS GIS

Area is flat and expansive and likely could be developed. Wetland areas exist throughout, but site does appear to gradually rise above significant low lying wet areas. Indian River floodplain is also a consideration.

may be best place for road. coordinate with BIHA

River approaches property line in this area and there does not appear to be adequate space for a roadway outside of flood way, consider easement or procurement through adjacent DNR property.

subject parcel for study.

easement may be drinking water related

Consider Flood Zones

May be a good spot to connect to BIHA development.

<u>CBS Land</u>
Parcel IDs
3-0260-000
3-0270-000

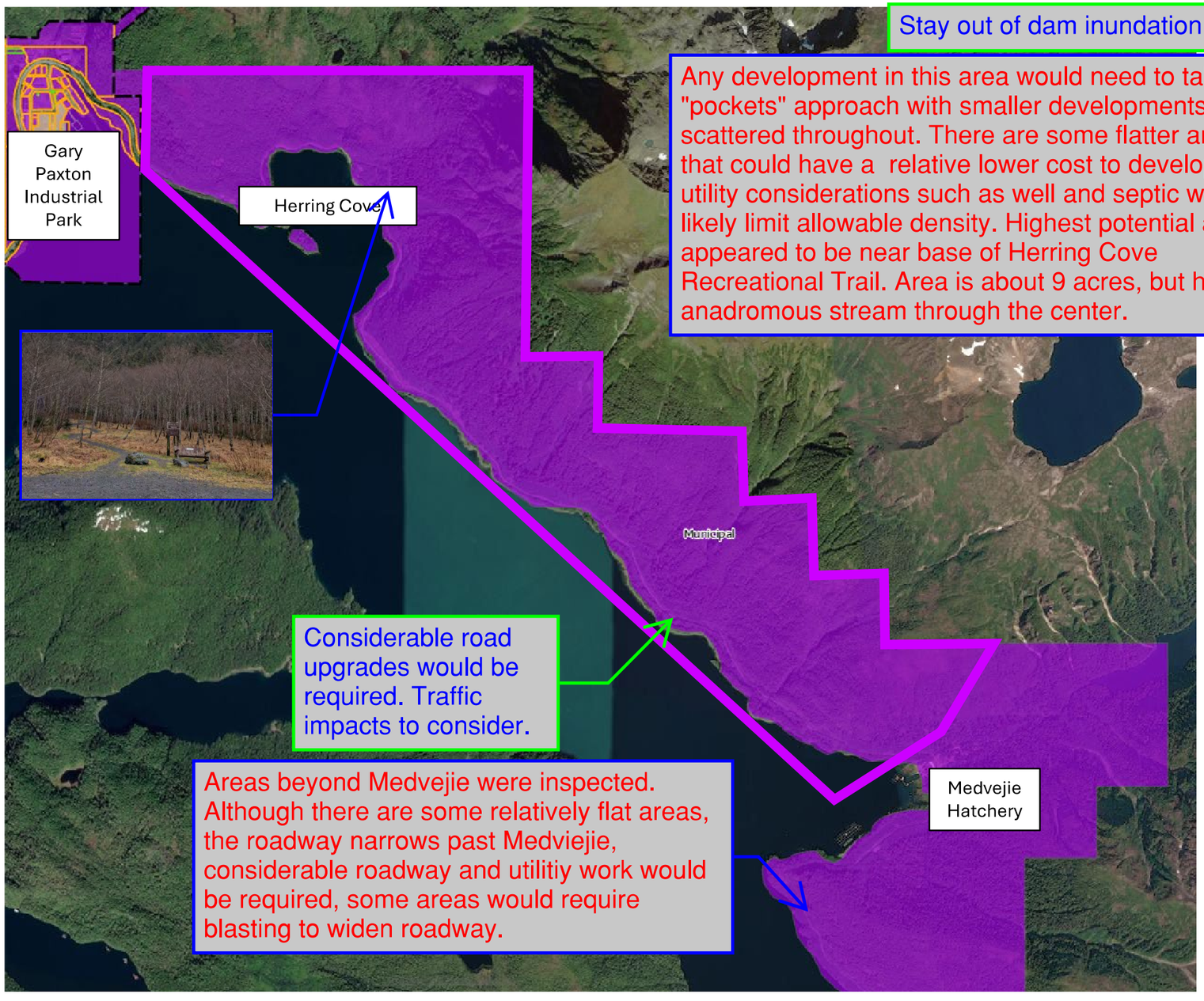
Legal Descriptions
Lots 1 & 2, US Survey 3695

<u>USFS Land*</u>
Parcel ID
1-8580-000

Legal Description
Lot 1-A, Mt. Verstovia – Gavan Hill Subdivision, Plat 2002-17

*While this property is not owned by CBS, there may be interest in including some or all of the parcel in this Study subject to Planning Commission and/or Assembly approval.

Area of Interest: Green Lake Road



Most of property cannot be developed due to FERC restrictions related to dam.

CBS in process of modifying boundaries of the restriction. Very long process.
This study could assist with boundary revisions.

May be pockets along roadway with flat area that could be developed.

Don't need intensive study. Find pockets along roadway, if any, for study.

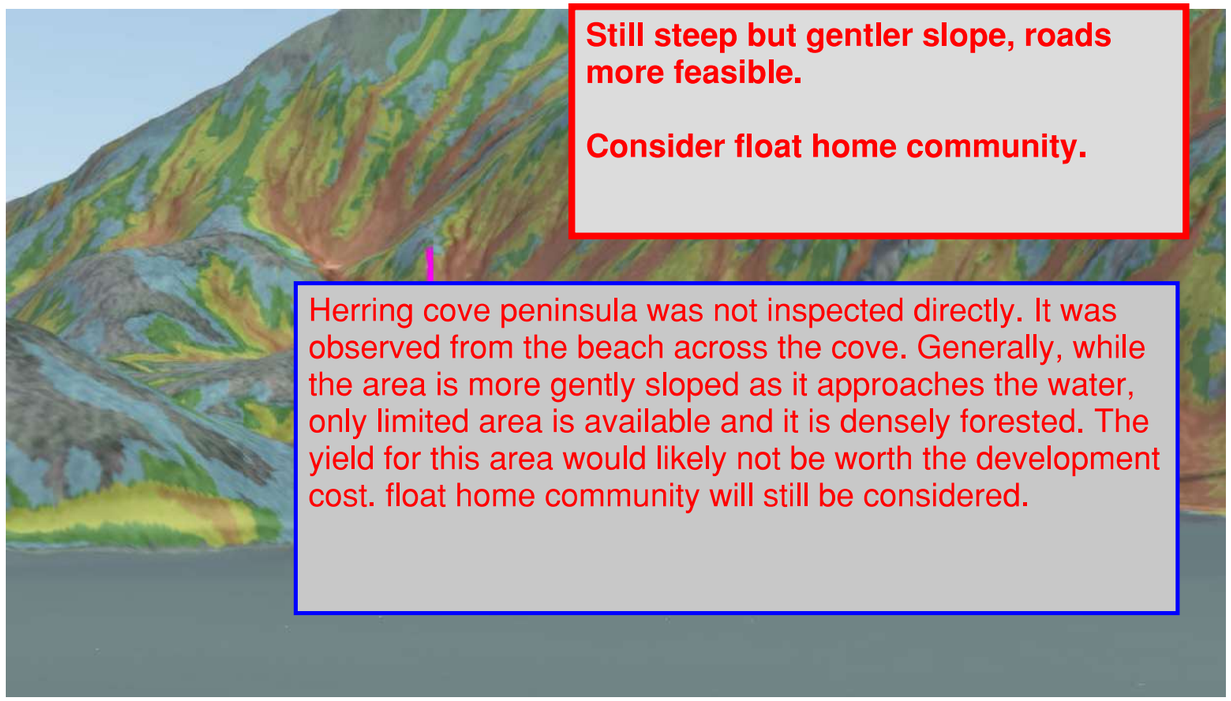
Float home community potential. Tidelands acquisition possible.

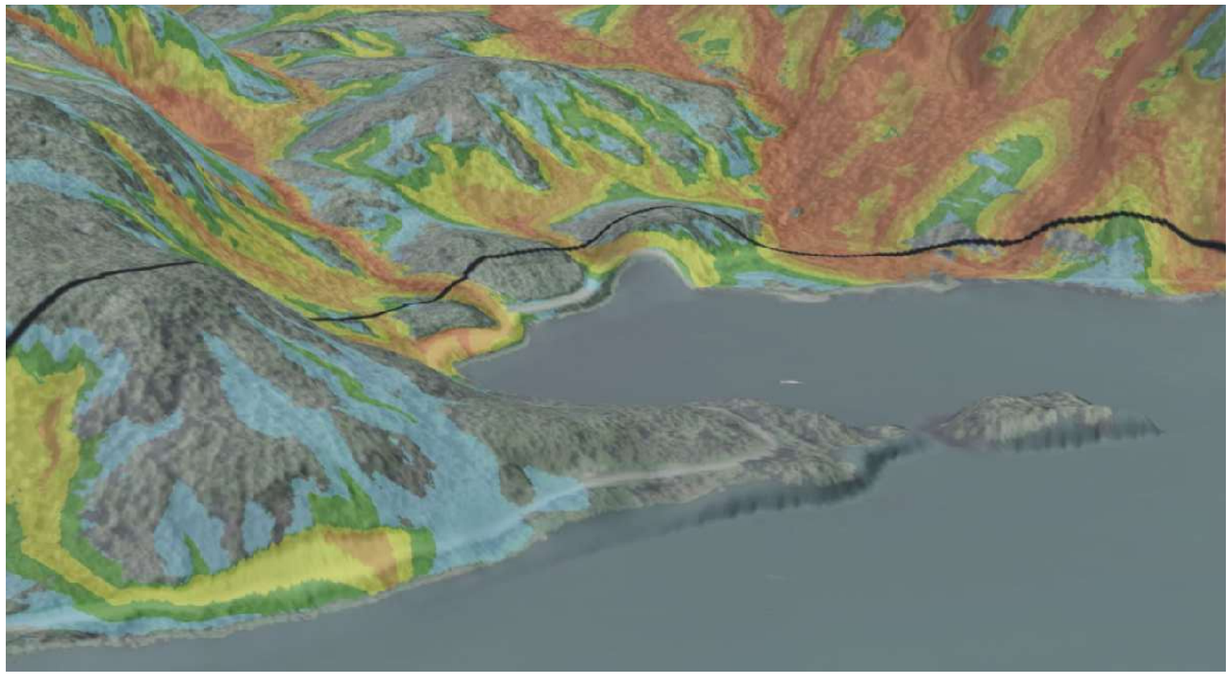
May support workforce housing at GPIP.

May look at wind and wave for float home community at herring cove.

- No Parcel ID
- Legal descriptions found in Release of Restriction and Correction to Quitclaim Deed No. 357, available to view: https://dnr.alaska.gov/ssd/recoff/search/docdisplay?SelectedDoc=20190010410&District=103
- Particular areas of interest include around Herring Cove, potential use of tidelands/submerged lands for float home development, and immediately along Green Lake Road before Medvejie Hatchery.

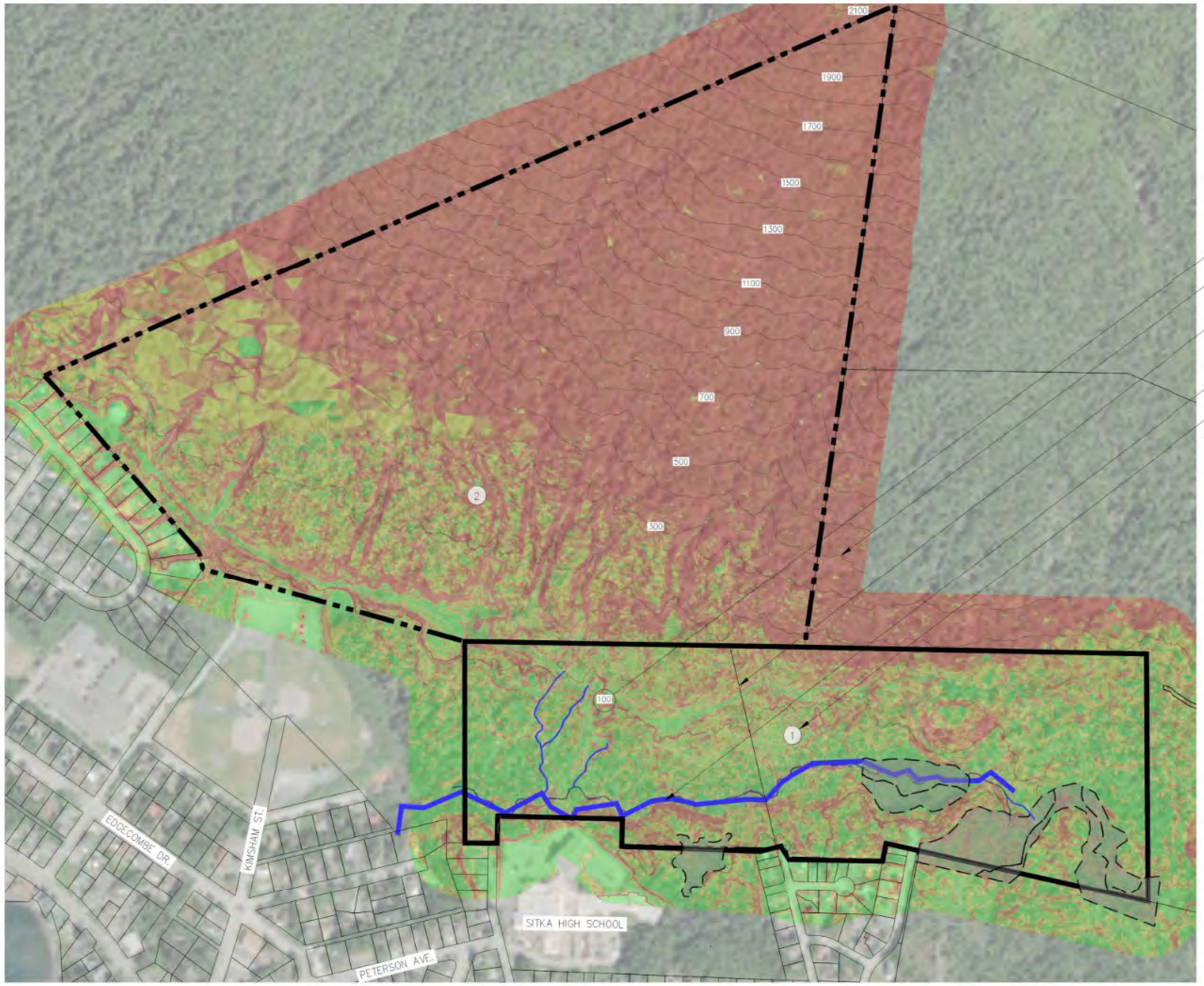
Green Lake Road – Herring Cove Peninsula





Osprey Street added during site visit.
General Observations, limited area, but easily developed. Accessible to roadway and utilities. If baseball field was sacrificed, area could be increased.
This area between Osprey Street and HPR likely candidate
This area, is steep below O'Cain Ave. Likely not a candidate, unless the ball field is available.
BLATCHLEY MIDDLE SCHOOL
OLGA STREET
CRABAPPLE DR
LAKEVIEW DRIVE
HALIBUT POINT ROAD
OSPREY STREET
MARINE STREET

Appendix B. Topographic and Buildable Area Maps



CONTOUR LABEL, TYP.

CONTOURS, TYP.

PROPERTY LINE, TYP.

PETERSON CREEK (ANADROMOUS)

SITE LABEL, TYP.

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	63.17	POTENTIAL FOR DEVELOPMENT
2	143.51	LOW DEVELOPMENT POTENTIAL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. WETLAND DATA APPROXIMATE, DERIVED FROM FIELD STUDY PERFORMED BY PND, SEPTEMBER 2025.

GAVAN HILL

TOTAL SUBJECT AREA: 206.68 ACRES

City and Borough of Sitka

DEPARTMENT OF PUBLIC WORKS

100 LINCOLN STREET SITKA, ALASKA 99835
TEL (907) 747-1804 FAX (907) 747-3158

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SCALE: SCALE IN FEET
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CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: GAVAN HILL

FND PROJECT #: 242091 C.A.N. NO.: AECC250

1

N:\24XX\242091 CBS Land Suitability and Feasibility Study\6. Drawings\1. Design\1. Civil\CBS LAND SUITABILITY.dwg — Klundquist — 11/26/2025

SITE LABEL, TYP.
CONTOUR LABEL, TYP.
CONTOURS, TYP.
PROPERTY LINE, TYP.

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	7.26	POTENTIAL FOR DEVELOPMENT

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. WETLAND DATA APPROXIMATE, DERIVED FROM FIELD STUDY PERFORMED BY PND, SEPTEMBER 2025.

SITKA HIGH SCHOOL
TOTAL SUBJECT AREA: 7.26 ACRES

City and Borough of Sitka
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SCALE: SCALE IN FEET 0 50 100 FT.
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: SHS

PND PROJECT #: 242091 C.A.N. NO.: AECC250

2

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LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. AREA NOT INCLUDED IN WETLANDS STUDY WETLANDS MAY EXIST.

UPPER EDGECUMBE DRIVE

TOTAL SUBJECT AREA: 36.16 ACRES

GRADE TABLES

COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	-

DEVELOPMENT POTENTIAL

SITE	AREA (ACRES)	NOTES
1	4.39	POTENTIAL FOR DEVELOPMENT
2	9.26	POTENTIAL FOR DEVELOPMENT
3	22.51	LOW DEVELOPMENT POTENTIAL

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0 150 300 FT.

DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: UPPER EDGECUMBE DRIVE

PND PROJECT #: 242091 C.A.N. NO.: AECC250

3

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GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. WETLANDS SHOWN ARE ASSUMED BASED ON LIMITED VISUAL OBSERVATIONS. ADDITIONAL WETLANDS MAY EXIST

BENCHLANDS
TOTAL SUBJECT AREA: 121.75 ACRES

LEGEND
- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	62.33	POTENTIAL FOR DEVELOPMENT
2	59.42	LOW DEVELOPMENT POTENTIAL

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CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: BENCHLANDS

PND PROJECT #: 242091 C.A.N. NO.: AECC250

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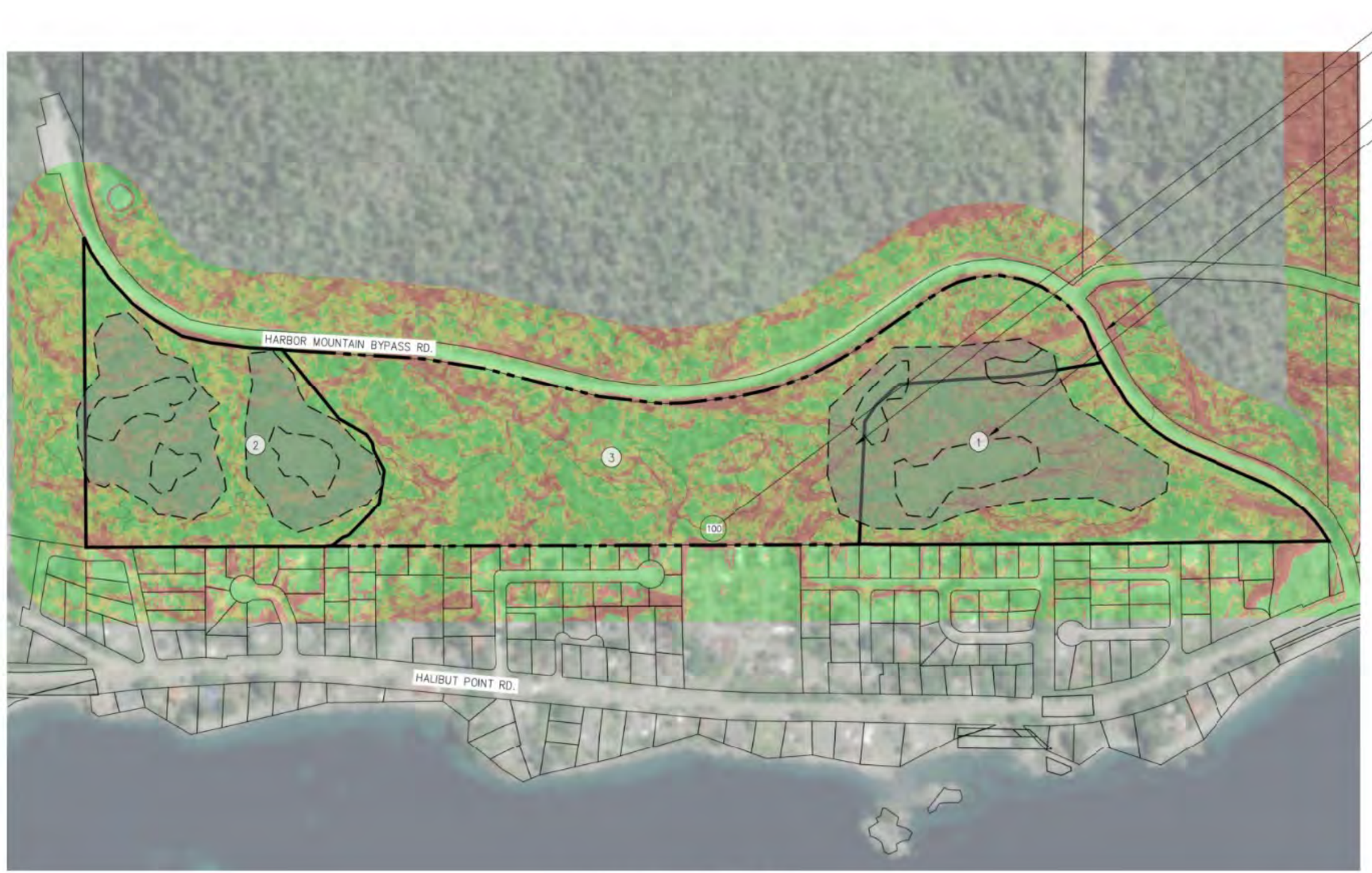

HARBOR MOUNTAIN ROAD
TOTAL SUBJECT AREA: 55.69 ACRES

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. WETLAND DATA APPROXIMATE, DERIVED FROM FIELD STUDY PERFORMED BY PND, SEPTEMBER 2025.

LEGEND

- STUDY BOUNDARY
- DEVELCPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	14.76	POTENTIAL FOR DEVELOPMENT
2	14.57	POTENTIAL FOR DEVELOPMENT
3	26.36	LOW DEVELOPMENT POTENTIAL

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SCALE: SCALE IN FEET 0 200 400 FT.
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: HARBOR MOUNTAIN ROAD

PND PROJECT #: 242091 C.A.N. NO.: AECC250

5

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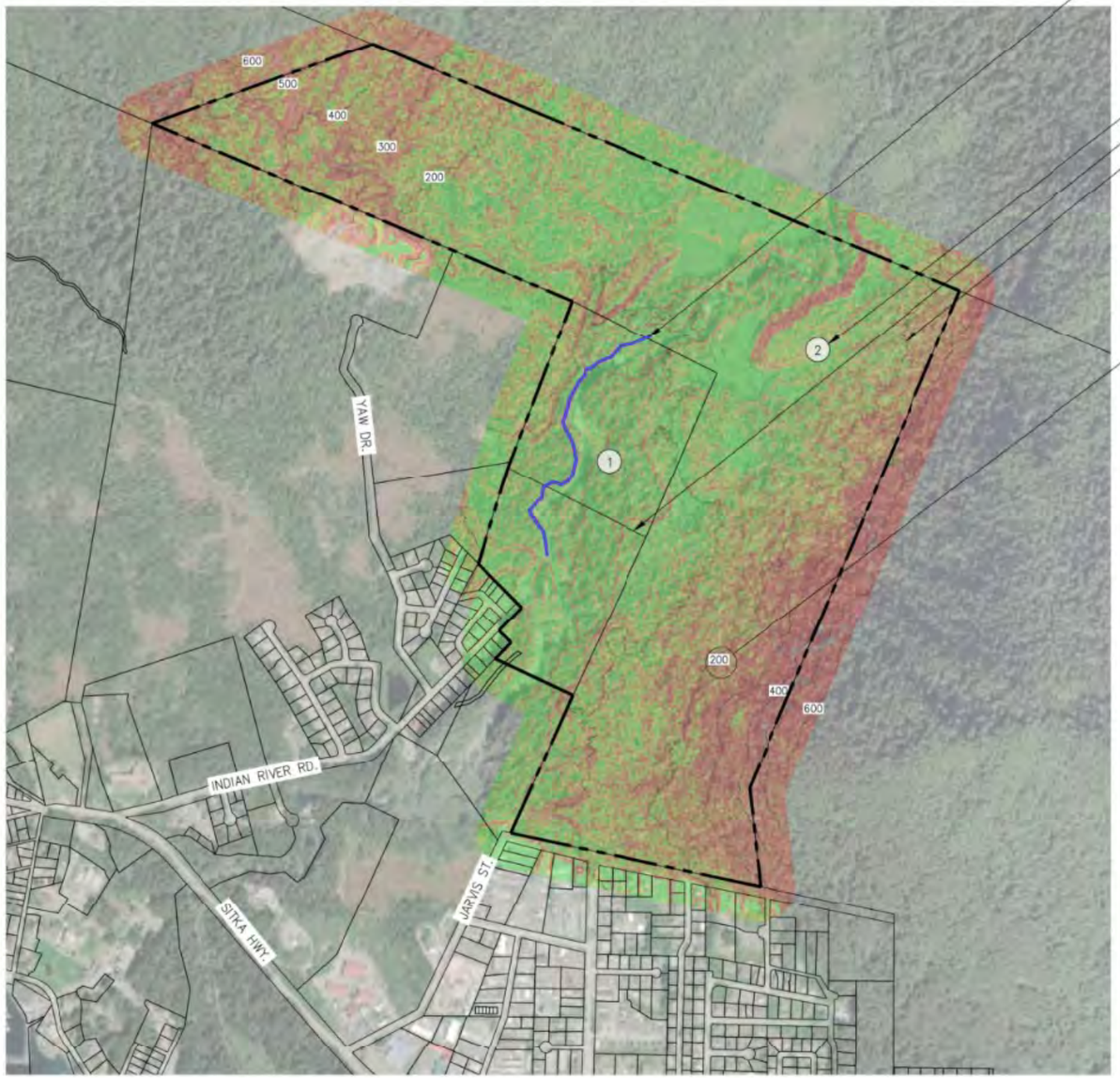

INDIAN RIVER

TOTAL SUBJECT AREA: 301.03 ACRES

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	56.81	CBS PARCEL
2	244.22	DNR PARCEL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. AREA NOT INCLUDED IN WETLANDS STUDY, WETLANDS MAY EXIST.

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SCALE: SCALE IN FEET
0 500 1000 FT.

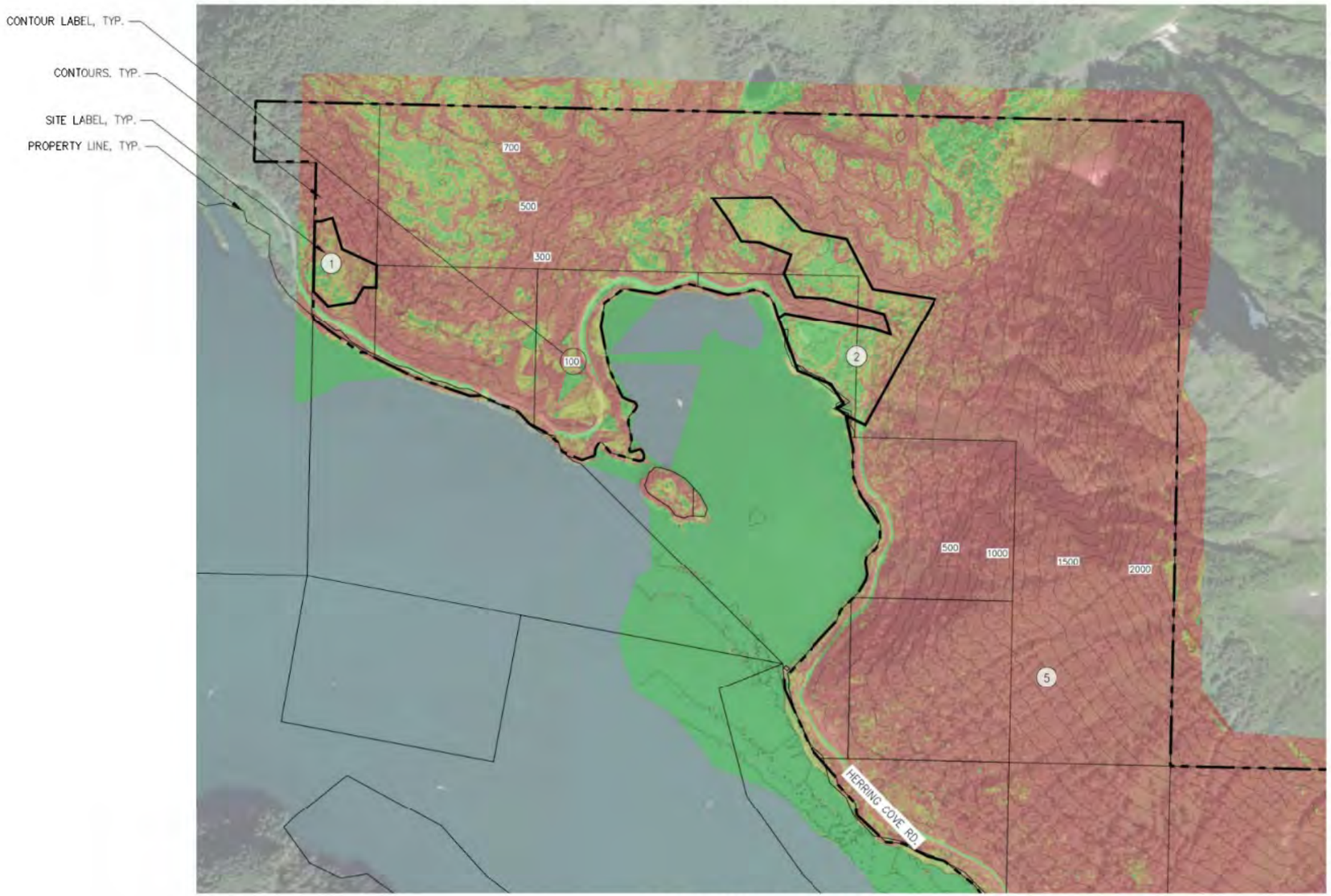
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: INDIAN RIVER

PND PROJECT #: 242091 C.A.N. NO.: AECC250

6



GREEN LAKE ROAD - PART 1

TOTAL SUBJECT AREA: 1157.60 ACRES

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	5.35	POTENTIAL FOR DEVELOPMENT
2	27.00	POTENTIAL FOR DEVELOPMENT
3	10.77	POTENTIAL FOR DEVELOPMENT
4	34.17	POTENTIAL FOR DEVELOPMENT
5	1080.31	LOW DEVELOPMENT POTENTIAL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. AREA NOT INCLUDED IN WETLANDS STUDY, WETLANDS MAY EXIST.

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SCALE: SCALE IN FEET
0 500 1000 FT.

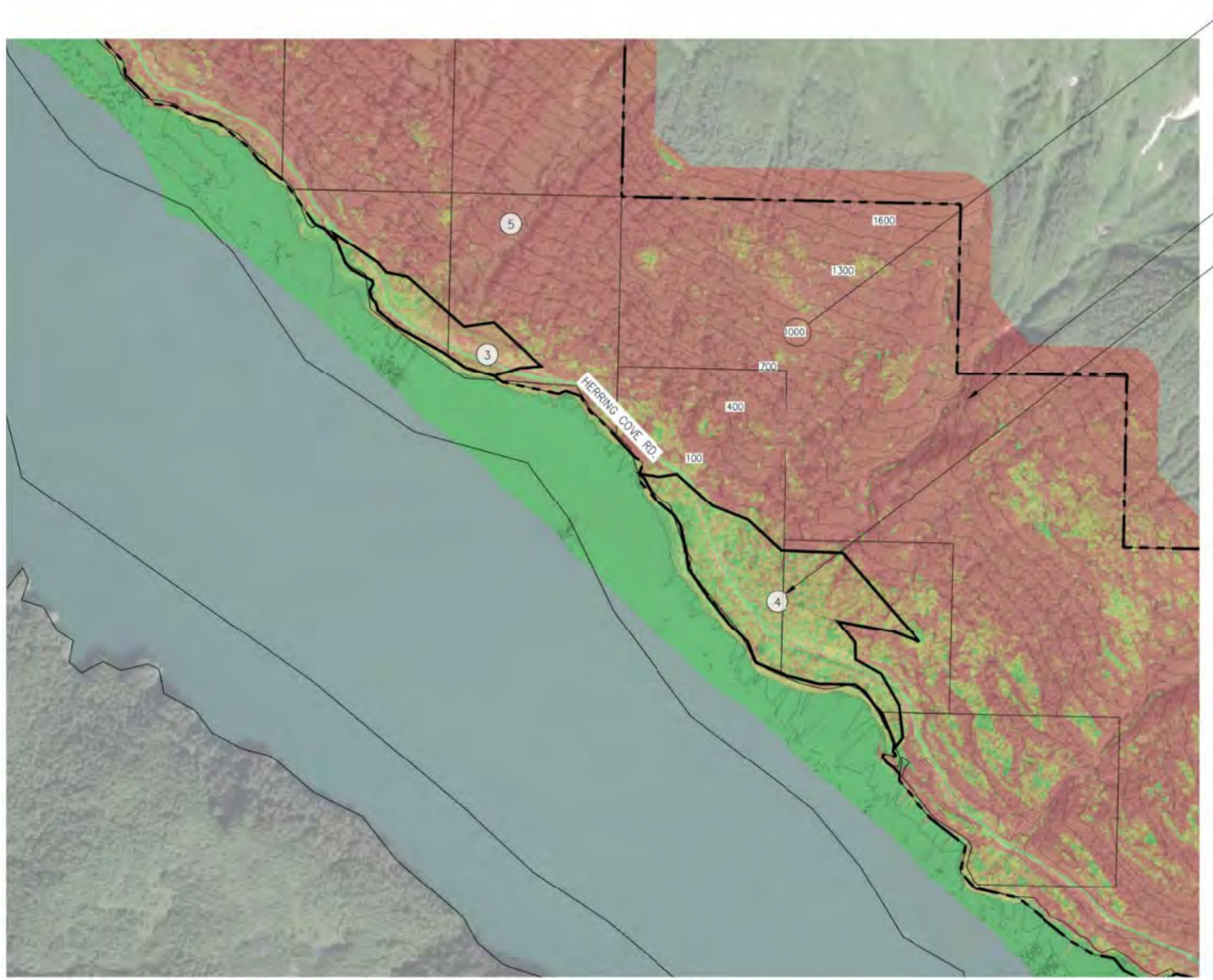
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: GREEN LAKE ROAD - 1

PND PROJECT #: 242091 C.A.N. NO.: AECC250

7



LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	5.35	POTENTIAL FOR DEVELOPMENT
2	27.00	POTENTIAL FOR DEVELOPMENT
3	10.77	POTENTIAL FOR DEVELOPMENT
4	34.17	POTENTIAL FOR DEVELOPMENT
5	1080.31	LOW DEVELOPMENT POTENTIAL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. AREA NOT INCLUDED IN WETLANDS STUDY, WETLANDS MAY EXIST.

GREEN LAKE - PART 2

TOTAL SUBJECT AREA: 1157.60 ACRES

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CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: GREEN LAKE ROAD - 2

PND PROJECT #: 242091 C.A.N. NO.: AECC250

8

OSPREY STREET
TOTAL SUBJECT AREA: 8.12 ACRES

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES

COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL

SITE	AREA (ACRES)	NOTES
1	1.04	POTENTIAL FOR DEVELOPMENT
2	1.42	LOW DEVELOPMENT POTENTIAL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.

N:\24XXX\242091 CBS Land Suitability and Feasibility Study\G. Drawings\1. Design\1. Civil\CBS LAND SUITABILITY.dwg – Klundquist – 11/26/2025

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0 100 200 FT.

DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: OSPREY STREET

PND PROJECT #: 242091 C.A.N. NO.: AECC250

9

Appendix C. Utility Capacity Studies

PND ENGINEERS, INC.

MEMORANDUM

PROJECT NO. 242091 **DATE: December 10, 2025**

PROJECT: Sitka Land Suitability and Feasibility Study

TO: Amy Ainslie, CBS Planning and Community Development Director

FROM: Tyler Bradshaw, PE & Jake Gemlo, EIT, PND Engineers

SUBJECT: Sitka Utility Capacity Analysis

1. BACKGROUND AND OBJECTIVE

The City and Borough of Sitka (CBS) has undertaken a project to study municipal land throughout the Borough to determine the feasibility of constructing residential housing on municipally owned parcels. PND Engineers Inc. (PND) is providing engineering services in support of this effort. CBS identified nine study areas for the project:

1. Gavan Hill
2. Sitka High School
3. Upper Edgecumbe Drive
4. Benchlands
5. Harbor Mountain Road
6. Indian River – Note at CBS direction, Indian River was not scored for development potential.
7. Green Lake Road
8. Herring Cove Peninsula
9. Osprey Street

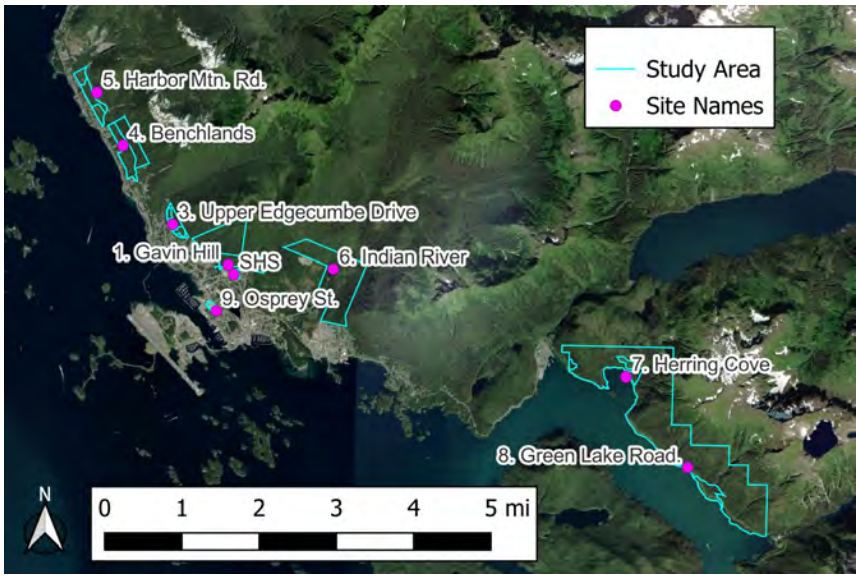


Figure 1 - CBS LSFS Study Areas

These study areas encompass a wide range of physical environments, utility conditions, roadway access characteristics, and development constraints. Given these differences, CBS required a clear and consistent method to compare sites for potential residential development. To support this need, PND developed a Decision Matrix using a Multi-Criteria Decision Analysis (MCDA) framework—a structured approach for evaluating multiple alternatives across diverse and sometimes competing criteria to inform site prioritization for subsequent project phases.

Phase I originally consisted of a project kickoff, site visits, and initial scoping efforts, followed by development of the preliminary Decision Matrix and the identification of candidate sites for more detailed evaluation in Phase II. However, as Phase I progressed, CBS requested that all study areas receive additional screening related to utility capacity, permitting considerations, and wetland impacts and mitigation costs before removing any sites from further consideration.

The Indian River parcel was removed from active consideration as CBS is evaluating acquiring Alaska Department of Natural Resources owned land north of the subject area.

PND has now completed the expanded Phase I scope, including the additional utility-related analyses requested by CBS. The purpose of this memorandum is to summarize the water, wastewater, and electrical utility access and capacity assessments; present the resulting utility-related scoring within the Decision Matrix; and describe how system constraints affect the relative feasibility of each site for future development.

2. EXECUTIVE SUMMARY

This analysis evaluated the feasibility of extending municipal water, wastewater, and electrical utilities to nine potential development areas in Sitka. Each location was assessed for proximity to existing utilities, the ability of surrounding infrastructure to accommodate new connections, and the scale of improvements required to support future residential development. Lot counts were estimated using minimum residential densities, and recommended water and wastewater main sizes were developed based on standard engineering criteria. Electrical studies were completed by Morris Engineering Group, and are summarized in Appendix A. Proximity and utility capacity scores outlined in the LSFS Decision Matrix were assigned using a standardized rubric, allowing consistent comparison across all areas.

Results show substantial variation in utility readiness across locations. Osprey Street, exhibits the strongest utility feasibility with minimal upgrade needs. In contrast, areas such as Green Lake Road and Herring Cove Peninsula lack adjacent utilities and would require major new infrastructure before development could proceed. Sitka High School, Gavan Hill, Benchlands, Harbor Mountain Road, Indian River, and Upper Edgecumbe fall between these extremes, with feasible connections but utility upgrades required, some of which are already outlined in the Sitka Water and Wastewater Master Plan list of capital improvement projects. A summary of scoring results and demand increases for each site is presented below in Table 1.

Table 1 - Summary of Utility Decision Matrix Scores

	Maximum Water Demand (gpm)	Maximum Sewer Demand (gpm)	Proximity to Utilities Composite Score	Water Capacity Score	Sewer Capacity Score	Electrical Capacity Score	Utility Capacity Composite Score
Gavan Hill	144	190	2	3	4	3	3
Sitka High School	20	25	1	2	3	1	2
Upper Edgecumbe	30	45	3	3	4	1	3
Benchlands	150	185	2	3	4	3	4
Harbor Mtn. Road	70	90	2	1	3	2	2
Green Lake	180	225	3	4	4	3	4
Herring Cove	-	-	3	4	4	4	4
Osprey Street	2	3	1	1	1	1	1

3. METHOD

3.1 DENSITY

Buildable land areas for each potential development location were taken from the Topographic and Buildable Areas Maps found in Appendix B. Lot counts were estimated by assuming all residential parcels would be developed at the minimum lot size permitted for single-family homes per SGC 22.20.030 (6,000 square feet). A land-use efficiency factor of 35% was applied to account for internal road rights-of-way, utility easements, topographic constraints, and other undevelopable areas; the remaining 65% of gross acreage was used to calculate the number of buildable lots. Increased density for duplex and multifamily homes was not evaluated at this stage, however, areas where study results indicate additional development or density will result in the need for significant utility upgrades are noted and have been considered in decision matrix scoring.

3.2 WATER

Household water demand was estimated using demographic data from the CBS 2020 Census and per-capita usage from USGS National Water Information System (2015). The average occupancy of 2.3 persons per household combined with the average per-capita consumption of 112 gallons per day (gpd) produced an estimated 258 gpd per lot. Multiplying this unit demand by the number of lots for each site yielded the projected average daily demand.

Peaking factors were taken from the water system study included in the Sitka Utility Master Plan, which provides a maximum day factor of 1.8 and a maximum hour factor of 2.7. These factors were applied to the average daily demand to determine projected maximum-day and peak-hour flows for system sizing purposes.

To evaluate pipe diameters, peak-hour flows were converted to velocities for standard distribution pipe sizes (6-inch, 8-inch, and 12-inch). Pipes larger than 12-inch do not appear to be necessary for any development. A pressure assessment was performed by identifying the nearest connection point to the existing water system and estimating both the elevation difference and the pipe length needed to reach the furthest and highest potential buildable location within each site. Hazen–Williams friction loss calculations were used to estimate dynamic losses along this route, and these losses were combined with elevation changes to determine the expected pressure at the highest point under peak-hour flow. The Hazen–Williams equation used for headloss was:

$$h_f = 4.52 \frac{Q^{1.85}}{C^{1.85} d^{4.87}}$$

Equation 1: Hazen-Williams formula for determining head loss.

where h_f is head loss in feet per 100 feet of pipe, Q is flow in gpm, C is the Hazen–Williams roughness coefficient (130 for ductile iron/PVC), and d is pipe diameter in inches. Head loss values were converted to psi (1 psi ≈ 2.31 feet of head) to evaluate performance relative to acceptable system limits. Pipe selection criteria required velocity less than 4 ft/s as per AWWA M22 and total pressure loss less than 20 psi where possible. The smallest pipe size meeting both criteria was identified. CBS public works guidelines generally require 8-inch minimum for water mains for maintenance and longevity purposes. Where calculations indicate smaller pipe diameters are sufficient, 8-inch diameter pipe is recommended. It should be noted that fire flow often controls main sizing and development types established in later phases may alter the results of water assessments as fire flow requirements are updated.

3.3 WASTEWATER

Per-capita wastewater generation was taken from the Washington State Criteria for Sewer Design, which provides a design value of 100 gallons per day (gpd) per person. This value was multiplied by the average household size in Sitka (2.3 persons per lot), based on CBS census data, to obtain an estimated 345 gpd per residential lot. Multiplying this unit wastewater flow by the number of projected lots at each site yielded the average daily wastewater flow for each development area. Peak wastewater flows were estimated using an industry standard peaking factor equation:

$$\text{Peaking Factor} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

Equation 2: Empirical formula for estimating wastewater peaking factors

where P is the estimated population for the service area in thousands. A minimum peaking factor of 2.5 was applied in cases where the equation produced a lower value. This factor was multiplied by the average daily wastewater flow to determine the peak flow rate for sewer sizing.

Pipe sizing was performed using Manning's equation to evaluate full-pipe flow capacity for standard gravity sewer diameters (8-inch, 10-inch, 12-inch, and 14-inch). Manning's equation was used with a roughness coefficient of 0.015 and a minimum slope of 0.5%. to calculate the maximum flow rate each pipe size can convey at 100% depth under uniform flow conditions. The smallest pipe diameter capable of conveying the calculated peak wastewater flow without surcharge was selected as the recommended sewer size for each development location.

3.4 ELECTRICAL

An Electrical capacity memorandum developed by Morris Engineering Group can be found in Appendix A.

4. DECISION MATRIX SCORING

The following two criteria apply to utilities within the Decision Matrix. For each site the three utilities under consideration were evaluated independently and then combined as follows to establish a composite score.

4.1 PROXIMITY TO UTILITIES

The Proximity to Utilities criterion asks the questions; How close are existing utilities (water, sewer, electrical)? Are there adequate right-of-way (ROW), easements, or city-owned property between the nearest utilities and the site, or will land procurement/easements be required? Are there clear paths, or will roadways/utility corridors need to be constructed? This criterion is not intended to consider the capacity of the closest utilities, only their existence. For each site, the proximity to utilities was determined as follows:

1 - Good Access: All utilities adjacent to buildable areas.

2 - Moderate Access: Two utilities adjacent, or all three nearby with limited extensions required.

3 - Poor Access: Only one or none adjacent; extensive new corridors required.

Proximity to Utilities scores for each area is discussed in Section 5.

4.2 UTILITY CAPACITY

The utility capacity criterion asks the questions; In the context of density potential, are the existing utilities adequate to support additional development, and to what degree? If upgrades are needed, to what extent and how much work would be required to complete them? Since capacity is determined differently for each utility, a score of 1 to 4 was assigned to each: water, sewer, and electrical. The average was taken of these three scores and rounded up to the nearest whole number to assign an overall composite capacity score for each site as shown in Equation 3.

$$\text{Composite Score} = \left\lceil \frac{S_{\text{water}} + S_{\text{wastewater}} + S_{\text{electric}}}{3} \right\rceil$$

Equation 3: Composite Utility Score found by rounding up the average of all three capacity scores.

The scoring criteria for each utility is as follows:

Water Capacity:

1 - Existing mains meet or exceed recommended sizing for new development

2 - Minor localized upgrades needed

3 - Significant upgrades (upsizing or pressure improvements) required

4 - Major areawide upgrade or new infrastructure needed

Wastewater Capacity:

1 - Adequate gravity and lift-station capacity

2 - Minor gravity upgrades needed

3 - Significant lift-station or gravity upgrades needed

4 - No remaining lift station capacity; major improvements required

Electrical Capacity:

Electrical capacity scores are given in Appendix A.

Utility capacity scores for each area is discussed in Section 5.

5. STUDY AREA SUMMARIES

5.1 GAVAN HILL

Gavan Hill has been estimated to support 300 residential units. Water service could connect from nearby 8-inch ductile iron mains on Charles Street and Verstovia Avenue, though the significant elevation gain and long routing required to reach interior areas will exceed what the existing mains can support without upgrades, as Charles St already has negative or very low pressures during fire flow scenarios. Planned transmission improvements in the Charteris zone would help reliability but do not eliminate the need for onsite system upgrades.

Wastewater from this area would flow toward the Monastery Street Lift Station via nearby 8-inch gravity mains; however, the lift station is already operating at its measured pumping limit and the 8-inch mains would need to be upsized in the event of full buildout. Electrical service is accessible from the Marine feeder but requires new extension routing to reach the upper portions of the site.

Table 2 - Gavan Hill Utility Summary

	Water	Wastewater
Total Number of Units	300	300
Average Daily Demand (gpd)	77,000	68,500
Max. Daily Demand (gpd)	138,000	NA
Max. Hourly Demand (gpm)	144	190
Minimum Pipe Size (in)	8	10
Velocity and Elevation Pressure Loss at Most Remote Location (psi)	18	NA

Proximity Score – 2

The southeastern edge has direct utility adjacency however most of the interior requires new corridors for looping and demand.

Capacity Score – 3

Water (3): Existing 8-inch mains do not provide adequate capacity for uphill extension without system upgrades or improved transmission supply.

Wastewater (4): The receiving lift station is at its pumping limit and requires major upgrades before accepting new flow. The connecting wastewater mains are undersized.

Electrical (3): High lot count requires new substation feeder.

5.2 SITKA HIGHSCHOOL

The Sitka High School area supports ~35 units and is directly adjacent to substantial water and sewer infrastructure. Water can be supplied from nearby 10-inch and 8-inch ductile iron mains along Verstovia Avenue, which exceed the recommended 8-inch minimum and do not require upsizing for housing, however Charles St already has negative or very low pressures during fire flow scenarios. Transmission upgrades planned in the Charteris zone may further improve long-term service, especially during fire flow scenarios.

Wastewater would flow to the Monastery Street Lift Station, but the station is currently operating at its measured pumping capability, limiting near-term development potential unless capacity is increased. Electrical service is readily accessible and requires minimal extension.

Table 3 - Sitka Highschool Utility Summary

	Water	Wastewater
Total Number of Units	35	35
Average Daily Demand (gpd)	9,000	8,000
Max. Daily Demand (gpd)	16,000	NA
Max. Hourly Demand (gpm)	20	25
Minimum Pipe Size (in)	8	8
Velocity and Elevation Pressure Loss at Most Remote Location (psi)	3	NA

Proximity Score – 1

All utilities are directly adjacent within existing ROW.

Capacity Score – 2

Water (2): Existing 10-inch and 8-inch mains exceed recommended sizing and can support new demand, but fire flow availability may limit density.

Wastewater (3): Receiving lift station cannot accommodate additional flows without major upgrades. Receiving wastewater mains are adequately sized.

Electrical (1): Electrical facilities can serve the area with minimal work.

5.3 UPPER EDGECUMBE DRIVE

Upper Edgecumbe is suitable for approximately 65 units but lies upslope from its nearest utility connections. Water would be supplied from a nearby 14-inch transmission main along Charteris Street, which is adequately sized, but the elevation gain and length of new distribution piping required mean additional improvements may be needed. Planned transmission upgrades in the Charteris zone may help overall supply but do not fully resolve upland pressure limitations and booster stations may be required to support development.

Wastewater from the area drains toward 8-inch gravity lines on Charteris Street, Cascade Creek Road, and Wortman Loop, ultimately reaching the Brady Lift Station. This station is scheduled for rehabilitation, indicating upgrades will be needed before new development can be supported. Upsizing of 8-inch mains along Charteris Street would be required to meet capacity requirements if full buildout were to occur. Approximately 25 units could be serviced without the need to upsize if located in lower pressure zones. Electrical service requires new overhead or underground routing through undeveloped areas.

Table 4 - Upper Edgecumbe Drive Utility Summary

	Water	Wastewater
Total Number of Units	65	65
Average Daily Demand (gpd)	16,500	15,000
Max. Daily Demand (gpd)	30,000	NA
Max. Hourly Demand (gpm)	30	45
Minimum Pipe Size (in)	8	8
Velocity and Elevation Pressure Loss at Most Remote Location (psi)	60	NA

Proximity Score – 3

Utilities lie near the southern edge; but no direct access available.

Capacity Score – 3

Water (3): Although the existing 14-inch transmission main is adequately sized, upslope service will require improvements to maintain adequate pressure.

Wastewater (4): The Brady lift station needs rehabilitation before additional flow can be accepted. Receiving gravity mains on Charteris Street would need to be upsized.

Electrical (1): Electrical extension is feasible with moderate infrastructure additions.

5.4 BENCHLANDS

Benchlands supports approximately 295 units and lies near several existing water lines, including 6-inch ductile iron mains on Bahovec Street and larger supply lines from the Harbor Mountain Tank. A planned new transmission line from the Harbor Mountain Tank will improve overall supply to the northern system and better support future extensions.

For wastewater, 8-inch gravity mains exist near Kramer Avenue and Bahovec Court which would need to be replaced with at least 10-inch lines and the receiving lift station must be expanded before new development can occur. Approximately 200 units could be built making use of an 8-inch main without the need for upsizing existing lines. Electrical utility access requires extension from existing distribution lines.

Table 5 - Benchlands Utility Summary

	Water	Wastewater
Total Number of Units	295	295
Average Daily Demand (gpd)	76,000	68,000
Max. Daily Demand (gpd)	136,000	NA
Max. Hourly Demand (gpm)	150	185
Minimum Pipe Size (in)	8	10
Velocity and Elevation Pressure Loss at Most Remote Location (psi)	9	NA

Proximity Score – 2

Water and wastewater are adjacent; electrical service requires additional routing.

Capacity Score – 4

Water (3): Existing distribution lines meet recommended sizing, but long routing distances and elevation profile require system upgrades for full buildout.

Wastewater (4): Expansion of the downstream lift station and gravity main replacement is required before adding flows.

Electrical (3): Significant modifications needed to extend electrical service.

5.5 HARBOR MOUNTAIN ROAD

The Harbor Mountain Road area can support approximately 140 lots. Water service benefits from direct proximity to major transmission lines supplied by the Harbor Mountain Tank. These mains exceed the recommended 8-inch minimum and can support development without upsizing. Planned transmission improvements from the Harbor Mountain Tank will further reinforce system supply.

Wastewater flows to nearby 16-inch gravity mains on Halibut Point Road, but the downstream lift station does not have capacity for additional flow until expanded. Electrical service requires moderate extension along the bypass corridor.

Table 6 - Harbor Mountain Road Utility Summary

	Water	Wastewater
Total Number of Units	140	140
Average Daily Demand (gpd)	36,000	32,000
Max. Daily Demand (gpd)	64,000	NA
Max. Hourly Demand (gpm)	70	90
Minimum Pipe Size (in)	8	8
Velocity and Elevation Pressure Gain at Most Remote Location (psi)	25	NA

Proximity Score – 2

Water and sewer are readily accessible; electrical requires moderate extension.

Capacity Score - 2

Water (1): Transmission lines near the site exceed recommended sizes.

Wastewater (3): Downstream lift station requires expansion before accepting new flow.

Electrical (2): Electrical facilities must be extended but no major rebuild is required.

5.6 INDIAN RIVER

The Indian River waterway traverses through the CBS owned parcel, severely restricting any potential development. At CBS direction, Indian River studies were limited to reviewing the site for feasibility to construct a roadway through the area to access Alaska DNR land north of the subject parcels.

Water service is available from a large-diameter cast iron main along the roadway and an 8-inch ductile iron main on Didrickson Street. The wastewater system includes 8-inch gravity mains along Indian River Road, which would need to be upsized in the case of significant usage increase. The downstream lift station is planned for replacement, which will restore and increase capacity for the area. Electrical service is nearby but requires modest extension into the development area.

Indian River is not included in decision matrix scoring, pending land acquisition decisions.

5.7 GREEN LAKE ROAD

Green Lake Road has an estimated 350 total lots across multiple buildable areas. There are no municipal water or sewer mains near the corridor, and providing service would require constructing extensive new transmission mains and wastewater conveyance infrastructure. Wastewater service would necessitate new lift stations and long force mains due to the lack of gravity sewer access. Electrical service also requires extensive extension from distant distribution lines.

Table 7 - Green Lake Road Utility Summary

	Water	Wastewater
Total Number of Units	350	350
Average Daily Demand (gpd)	94,000	84,000
Max. Daily Demand (gpd)	170,000	NA
Max. Hourly Demand (gpd)	180	225

Proximity Score – 3

No utilities directly serve the corridor.

Capacity Score – 4

Water (4): No nearby water mains; major new transmission routing required.

Wastewater (4): Requires new lift stations and long force-main routing.

Electrical (4): Significant extension required from remote feeder infrastructure.

5.8 HERRING COVE PENINSULA

Herring Cove Peninsula supports no buildable lots for conventional development due to topography and access constraints. The site has no direct connection to water or wastewater infrastructure. The closest water source is a transmission main along Sawmill Creek Road, well outside the feasible range for connection. Wastewater service would require new lift stations and force mains across difficult terrain. Electrical service also requires long and complex extension.

Proximity Score – 3

No utilities reach the peninsula.

Capacity Score – 4

Water (4): No feasible municipal connection without major new transmission infrastructure.

Wastewater (4): Conventional sewer service is not practical.

Electrical (4): Significant extension required.

5.9 OSPREY STREET

Osprey Street can support approximately 5 lots. Water service is available from both 6-inch cast iron and 8-inch PVC mains, which meet or exceed recommended sizing. Wastewater service connects directly to 8-inch gravity mains and the 10-inch main along Halibut Point Road, providing more than adequate capacity for a small infill project. Electrical infrastructure is located adjacent to the site and requires minimal extension.

Table 8 - Osprey Street Utility Summary

	Water	Wastewater
Total Number of Units	5	5
Average Daily Demand (gpd)	1000	1000
Max. Daily Demand (gpd)	2000	NA
Max. Hourly Demand (gpd)	2	3
Minimum Pipe Size (in)	8	8
Velocity and Elevation Pressure Loss at Most Remote Location (psi)	2	NA

Proximity Score – 1

All utilities are immediately adjacent within established ROW.

Capacity Score – 1

Water (1): Existing mains meet recommended sizing and have adequate capacity.

Wastewater (1): Existing gravity mains can support the small increase in flow.

Electrical (1): Minimal electrical extension required.

P | N | D
ENGINEERS, INC.

Appendix A. Electrical Capacity Study

MEMO

To: Tyler Bradshaw, PND
From: Brian Meyers, MEG
Date: 2025-12-05
Re: Sitka Electric Utility Study Memo

Executive Summary: Existing electric utility infrastructure is adjacent to most of the new development areas proposed but capacity of the existing feeders to accommodate full build outs is not anticipated. Where lot counts greater than 200 are proposed, an all-new feeder will be required. The new north areas (Benchlands, Harbor Mountain Road, Upper Edgecumbe Drive) have less existing feeder capacity at their disposal than the new center areas (Gavan Hill, Indian River, Sitka High School, Osprey Street), but both areas have pockets of larger lot counts which would warrant consideration of an all-new feeder. All south area development (Green Lake Road Part 1, Part 2) would require extensive electric utility development as little currently exists. For all areas being considered we recommend deploying underground distribution featuring pad mounted switch cabinets and transformers to support a looped distribution scheme as this provides electric utility resiliency and better service support over time.

Part 1 – Existing Electric Utility Infrastructure

The Electric Utility (City and Borough of Sitka or CBS) distributes power in town via a mix of overhead and underground circuits. Distribution is via 12,470 kilovolt (12.47kV) circuits that are sourced from two hydropower plants fed from freshwater lakes. Hydropower is generated at 69kV and transmitted overhead to the Jarvis and Marine substations where voltage is stepped down to 12.47kV and fed around town. The Marine substation generally serves the north areas of town while the Jarvis substation generally provides power to the central portions. South towards Gary Paxton Industry Park and the Medvejie Hatchery a third transmission line from Blue Lake provides power.

The Project area includes several distinct development zones that require power from different electric utility feeders. As defined elsewhere in the study documents, areas of future development include:

- North Areas: Harbor Mountain Road, Benchlands, Upper Edgecumbe Drive
- Central Areas: Gavan Hill, Sitka High School, Osprey Street, Indian River
- South Areas: Green Lake Road – Part 1, Green Lake Road – Part 2

The existing utility feeders most likely to support development in the north and central areas are sourced from the Jarvis and Marine substations. Generally, the Marine substation supports north area loads while Jarvis supports central area loads. Based on current understandings we note the following:

1. Existing north area feeders (from Marine Substation) are more heavily loaded with reduced capacity.
2. Existing central area feeders (from Jarvis Substation) are less heavily loaded and have more capacity.

The CBS standard circuit for new residential underground includes 15kV rated, No. 2 gauge, 133% insulated, full neutral cable. When installed in a duct this circuit is rated to 3.8MW but we assume a maximum rating of 3MW (80% of capacity) to account for swings in load and voltage drop. Based on a per-lot load of 12.5kW (12.5kVA, derived in Part 2 below) a 3MW feeder will accommodate up to 240 lots if no other loads exist on that feeder (3MW/12kW = 240). In the case of existing circuits that are lightly loaded we recommend only 50% of a new feeder's capacity be assumed as capable of being supported by the existing feeder, or a total of 120 new lots.

We estimate between $15,000-$20,000 per pole for expanded overhead tied into existing overhead infrastructure. This assumes a pole-to-pole span of approximately 200 feet. Underground distribution is far more expensive than this due to the increased labor, trenching, cable and conduit material costs, pad mount equipment costs, etc. Potential development locations can be limited by several factors, including difficult terrain to build upon, landslide zones, low areas subject to flooding. Most of the development zones hug adjacent roadways which would lend themselves to multiple electric utility insertion points via existing or new right of ways. The ability to have multiple paths for incoming power allows for loop fed power which has some advantages as noted in Part 3 below.

Most of the existing residential power in Sitka is served via wooden utility poles with overhead power lines which also host television and telephone services. Overhead power includes pole mounted transformers. Newer developed areas include underground distribution that serves customers through pad mounted switches and pad mounted transformers. Generally utility transformers are loop fed with one transformer sized to power between 4-6 lots. Older parts of town feature more overhead powerlines and pole top transformers and equipment but the trend in recent years has been underground based electrical. Underground has higher installation or 'first' costs vs. overhead work but is less susceptible to weather driven power outages.

In evaluating electric utility capacity and the amount of work needed to provide power to the development areas the following ratings descriptions have been used. Each of the three distinct parts of town are separately discussed below.

1. '**Least challenging'** as adequate existing capacity minimal improvements needed. Here both feeder capacity exists and extending the utility infrastructure is relatively easy as it is close by.
2. '**Challenging**' as nearby utilities have capacity, but some improvements are necessary. Here, feeder capacity exists but much physical work is needed to get it to the proper connection locations.
3. '**Very challenging'** as nearby Utilities have some available capacity, but extensive improvements are necessary. In this case a new feeder must be brought to the area from the existing substation, though there is existing utility infrastructure to support this work (at least partially along the path).
4. '**Most challenging'** as extensive improvements are needed, both all new feeder(s) and all new physical utility infrastructure as none currently exists in the area.

North Areas: See Image 1 below and paragraphs in red. Here total power needs of around 6.2MW could be expected at full build-out with Benchlands the largest need at 3.7MW, Harbor Mountain Road the second largest at 1.7MW and Upper Edgecumbe Drive the third at 0.8MW. The total amount needed exceeds the capacity of two distribution feeders, and existing area feeders are already moderately loaded. If fully realized, we anticipate several new feeders being required.

Benchlands: With up to 294 new lots here, the existing area feeders are not adequate for full expansion. A partial buildout is likely supported by the existing feeders, but new feeders will be required for complete buildout. The area runs parallel to Halibut Point Road (HPR) and due to its shape and proximity to HPR multiple utility tie-in points via new right of ways would be prudent. Existing overhead along HPR and could be expanded to the area via several new spans running up the hill. The new load is substantial and existing overhead expansion would be moderate. This build-out is considered **very challenging**.

Harbor Mountain Road: Estimating up to 138 new lots in several pockets developed between HPR and Harbor Mountain Bypass Road. Partial build out can likely be supported by existing area feeders, but a new feeder should be is anticipated for full build out. Boxed in by HPR downhill and the Bypass Road uphill several options for feeding utility power to the zone exist. Due to its stretched shape, it lends itself to multiple tie-in points and existing overhead appears adjacent within a span in several locations. The added load is moderate and existing infrastructure is in proximity. We consider this build-out **challenging**.

Upper Edgecumbe Drive: Estimating up to 64 new lots in pockets developed along the hillside. Existing area feeders should have adequate capacity for this development. Located uphill from Edgecumbe Drive and the connected Charteris St., there are adjacent overhead lines which would be extended into this area with relative ease. The load added is small and existing infrastructure is in proximity. We consider this build-out **least challenging**.

Image 1 – North Development Areas and Anticipated Lot Counts

Note about North Area Analysis**:** according to CBS a separate project is being discussed to extend a 69kV transmission line along Kramer Ave to a new substation in a northern location. Such an expansion could independently support most northern areas, reducing demands on Marine & Jarvis Substation.

Central Areas: See Image 2 below and paragraphs in blue. Total power needs are 20% higher than the full north zone with a 7.5MW load anticipated for the 600 new lots. While existing central area feeders do have more available capacity vs. the existing north feeders, new feeders would be required to accommodate the complete build out of central developments.

Gavan Hill: Here up to 298 new lots are developed. Existing area feeders do not have capacity for this load. Gavan Hill juts to the south beyond the existing street system, making a looped connection from the south more difficult, though it is a wide enough footprint that several entry points through new right of ways could be considered. Existing overhead can be extended relatively easily into the footprint of the new development area, but the new area runs away from town up the hill. The new load is substantial and existing overhead is within proximity. We consider this build-out **very challenging**.

Indian River: Up to 268 new lots are planned here. Existing feeders do not have capacity for the full build out. The Indian River Trailhead area existing utility is underground distribution, while the subdivision just to the south is overhead connected. Therefore, several different existing utility tie-in opportunities, with different cost considerations, will need to be further evaluated for this area. The new load is substantial and existing utility infrastructure is within proximity. We consider this build-out **very challenging**.

Sitka High School: Estimating up to 34 residential units likely in a higher density configuration due to the small landlocked location. Area feeders have sufficient capacity for this full build. The location is within close proximity to existing utility that can be extended as required. The new load is small and existing overhead is within proximity. We consider this build-out **least challenging**.

Osprey Street: Estimating 4 new lots developed in the skinny plot east of the Middle School. Several area feeders are available and should have sufficient capacity to serve. Existing utility is adjacent and can be extended as required. The new load here is small and existing overhead is within proximity. We consider this build-out **least challenging**.

Image 2 – Center Area Developments and Anticipated Lot Counts

South Areas: See Image 3 below and paragraph in purple. Total power needs would reach 4.6MW if the full 364 lots were developed. Little utility infrastructure exists at present, but the adjacent Blue Lake Dam has capacity. Full build out would likely require a minimum of two new feeder circuits.

Green Lake Road Part 1 & Part 2: Estimating as many as 364 new lots with the highlighted 'potential for development' areas likely the first focus areas. Little utility infrastructure exists in this part of town so an extensive & intensive effort would be needed to establish the needed overhead pole lines, including all the associated tree clearing, pole guying, etc. Plenty of power is available from the adjacent Blue Lake Dam but much effort would be expected to push power to serve residents and business development in these areas. At least two new feeders should be considered with total lengths running for several miles. A large load is forecasted, and extensive new overhead infrastructure is required. We consider this build-out **most challenging**.

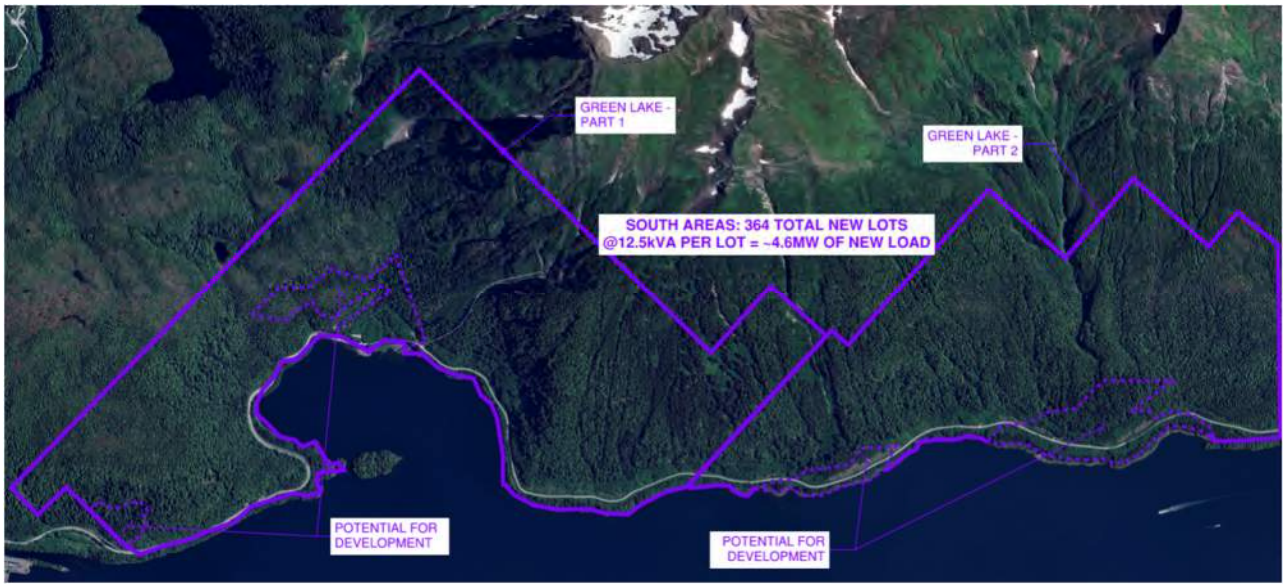


Image 3 – South Development Areas

Part 2 – Residential Load Calculations

The National Electrical Code (NEC) requires designers use methods outlined in the Code for sizing electrical services to power residences. Two methods, the 'standard' and the 'optional' method are available, and both apply per square foot rules, use demand factors, and have rules for larger appliance loads when doing the calculations. The calculations result in power expressed in volt-amps (VA) which represents total power supplied (both real and reactive power). Generally, the standard method results in more conservative calculated loads which we deem unsupported for this report, therefore we are following the optional calculation method as described below.

OPTIONAL METHOD			
RESIDENTAL SQ FT: 1500 SF			
LOAD CALCS	**VOLT-AMPS (VA)**	**ITEM ID**	**DESCRIPTION**
3VA PER SF + 4500VA	9000	A	PER SQ FT FOR LTG, RECS, SMALL APPLIANCES
RANGE	7000	B	
DRYER	5000	C	
WATER HEATER	4500	D	
DISHWASHER	1200	E	
DISPOSAL	950	F	
WATER SOFTNER	750	G	
SUM OF ITEMS A-G	28400	H	
9000VA + 40% OF 'H' THAT IS >9K	16760	I	
ELECTRIC HEAT @65%	5850	J	6W PER SQ FT FOR ELECTRIC HEAT IS ASSUMED
TOTAL DEMAND 'I' + 'J'	**22610**		
KVA PER RESIDENCE:	**22.60**		

The results of the NEC calculations for a 1,500 square foot residence are shown in the table above. The 22610 VA total is equal to 94 amps of current for a 120/240V, 1-phase service (22600/240 = 94).

OPTIONAL METHOD			
RESIDENTAL SQ FT: 1500 SF			
LOAD CALCS	**VOLT-AMPS (VA)**	**ITEM ID**	**DESCRIPTION**
3VA PER SF + 4500VA	9000	A	PER SQ FT FOR LTG, RECS, SMALL APPLIANCES
RANGE	7000	B	
DRYER	5000	C	
WATER HEATER	4500	D	
DISHWASHER	1200	E	
DISPOSAL	950	F	
WATER SOFTNER	750	G	
SUM OF ITEMS A-G	28400	H	
9000VA + 40% OF 'H' THAT IS >9K	16760	I	
ELECTRIC HEAT @65%	5850	J	6W PER SQ FT FOR ELECTRIC HEAT IS ASSUMED
TOTAL DEMAND 'I' + 'J'	**22610**		
KVA PER RESIDENCE:	**22.60**		

For comparison, the NEC standard and optional methods are tabulated in the table below for house sizes of 1500, 2000, and 2500 square feet. For the purposes of this study, we are assuming the average load size per house (per lot) of 25.1 kVA which is equivalent to a 2,000 square foot home.

SUMMARY OF FINDINGS - NEC LOAD CALCULATIONS		
HOUSE SQ FT	**NEC - STANDARD METHOD**	**NEC - OPTIONAL METHOD**
1500	31.6 kVA	22.6 kVA
2000	35.1 kVA	25.1 kVA
2500	38.7 kVA	27.7 kVA

Load Assumptions:	
7000 VA	Range
6 VA SQ FT	100% Electric Heat (no gas)
5000 VA	Dryer
4500 VA	Water Heater
1200 VA	Dishwasher
750 VA	Water Softner
950 VA	Garbage Disposal

Electric utility companies rarely design their distribution capacities to the full connected load level presented by design engineers who use the NEC calculations. Instead, it is common that a derating factor is applied when utilities calculate the sizes of their service equipment design their primary distribution for customers. Based upon conversations with CBS and confirmed in conversations with other utilities inside and outside of Alaska, a 50% derating factor is reasonable and is used in this report. Therefore, we are assuming a per lot load of 12.5kVA which is 50% of the calculated demand for a 2000 SQ FT residence as described above. This value is conservative enough to account for cases where there are increased loads due to electric vehicle chargers, shop loads in standalone garages, etc. The per-lot figure of 12.5kVA assumes only single-family dwellings are constructed. It is **not** applicable for duplexes, high density apartment buildings, mixed use commercial construction, etc.

Part 3 – Electric Utility Infrastructure Expansion Considerations

There are many things to consider moving forward when it comes to electrical distribution:

1. **Underground distribution vs. overhead distribution.** The existing CBS utility is primarily overhead with pockets of underground distribution. Overhead distribution is a lower first cost and is more adaptable to future growth and plan changes. Overhead is more susceptible to weather damage and outages and requires more regulator maintenance compared to underground utility systems. We recommend underground distribution with pad mounted equipment be used for new developments.

2. **Single vs. multiple utility site insertions.** Extending separate electric utility circuiting into the project area allows for powering the project area from multiple locations. Such a setup provides redundancy and allows one of the feeds to be de-energized for servicing while the other feeders continue to supply power from the other direction. We recommend multiple utility distribution insertion points into new developments.

3. **Loop vs. radial network systems.** Dual electric utility feeds, as recommended in Item 2 above, will require transformers to be loop fed. See Image 4 below for a comparison between loop and radial systems. Loop systems provide the means to push power from either direction, providing better continuity of service than radial systems. A power failure, short-circuit, or downed power line in a radial system would interrupt power to all lots fed via a radial distributed system. Where power is provided to cul-de-sacs and dead-end streets it is less expensive to use radial connected transformers and more justified since power outages are less impactful, we recommend that only loop fed transformers are used and the underground distribution is designed for loop networks, including conduits in & out of all transformers. See below graphical comparisons.

Image 4 - Radial (left) and Loop (right) network systems

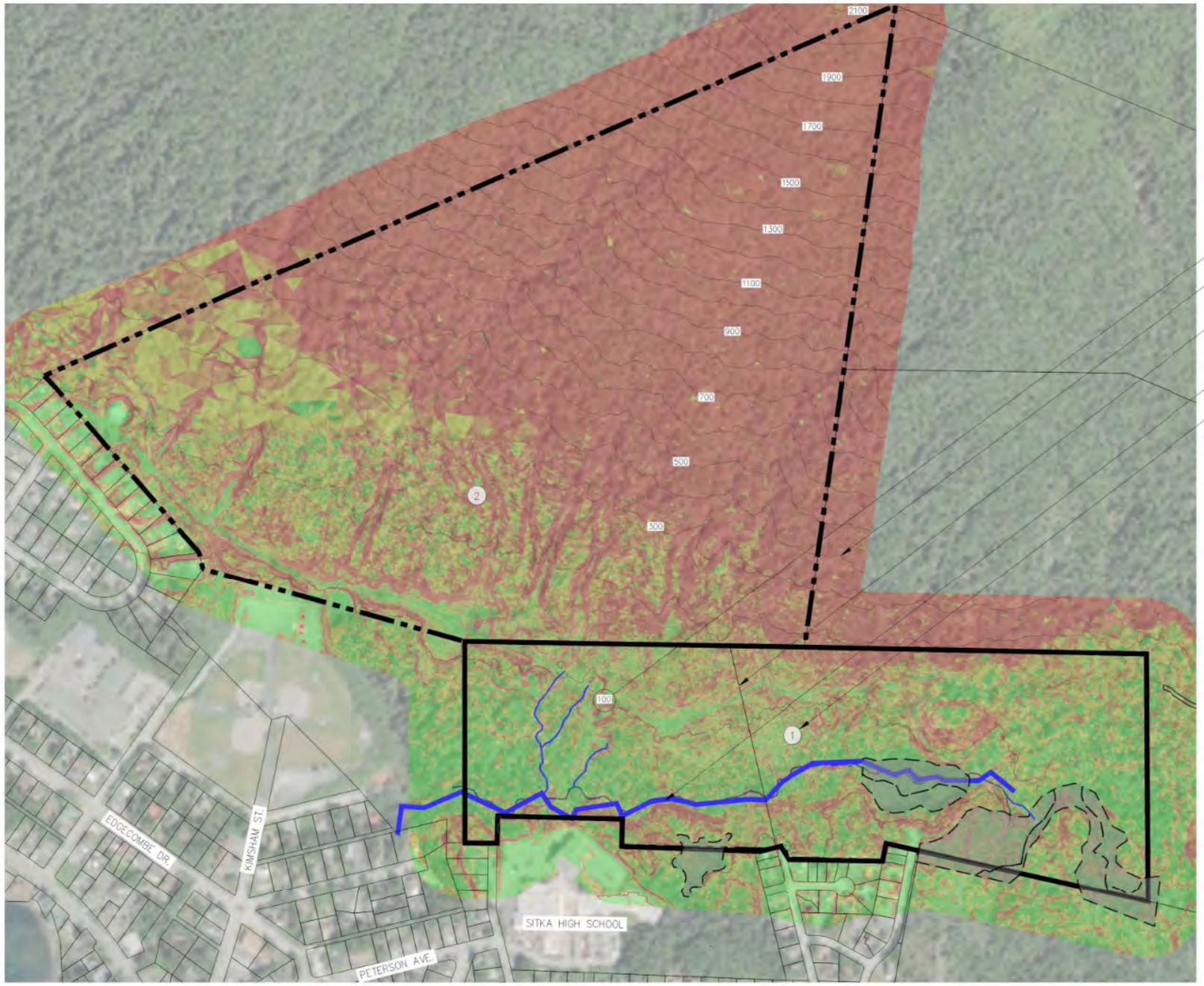
4. **Live front vs. dead front construction.** We encourage the use of only dead front electric utility equipment where insulating bushings that are electrically isolated are used with insulated cable elbows on the conductors. While more expensive, such setups are safer as no live terminals are within reach inside enclosures.

5. **Dead breaks vs. load breaks.** The use of load break elbows that are insulated but that can be plugged & unplugged while energized help with the speed of outage work and servicing without the time it takes to unbolt dead break elbows.

6. **Spares.** For all conductor runs we strongly recommend a spare conduit with pull string be ran with each live conduit.

Conclusion: Development in the northern areas of town are a bit more constrained by limited existing feeder capacity vs. the central areas of town. Generally, none of the highlighted area should expect full build out capability without new feeders being deployed, save for the smaller Upper Edgecumbe Drive area in the north, and Sitka High School and Osprey St. areas in the central areas. Large developments, 150 or more lots, should anticipate all new feeders to supply power. The south developments will require extensive work to get overhead power to the areas. Generally, the locations and shapes of the proposed development zones are within a reasonable physical proximity for extending the existing electric utility into the new areas and allow for dual ended distribution for more resilient and serviceable utility infrastructure therein. We recommend the use of underground electric utility infrastructure vs. overhead to help reduce weather-related power outages.

Appendix B. Topographic and Buildable Area Maps



CONTOUR LABEL, TYP.

CONTOURS, TYP.

PROPERTY LINE, TYP.

PETERSON CREEK (ANADROMOUS)

SITE LABEL, TYP.

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	63.17	POTENTIAL FOR DEVELOPMENT
2	143.51	LOW DEVELOPMENT POTENTIAL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. WETLAND DATA APPROXIMATE, DERIVED FROM FIELD STUDY PERFORMED BY PND, SEPTEMBER 2025.

GAVAN HILL

TOTAL SUBJECT AREA: 206.68 ACRES

City and Borough of Sitka

DEPARTMENT OF PUBLIC WORKS

100 LINCOLN STREET SITKA, ALASKA 99835
TEL (907) 747-1804 FAX (907) 747-3158

REVISIONS

REV.	DATE	DESCRIPTION	DWN.	CKD.	APP.

PND ENGINEERS, INC.

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Juneau, Alaska 99801
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Fax: 907-586-2099
www.pndengineers.com

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DRAWN: ____ APPROVED: ____

SCALE: SCALE IN FEET
0 250 500 FT.

DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: GAVAN HILL

FND PROJECT #: 242091 C.A.N. NO.: AECC250

1

N:\24XX\242091 CBS Land Suitability and Feasibility Study\6. Drawings\1. Design\1. Civil\CBS LAND SUITABILITY.dwg — Klundquist — 11/26/2025

SITE LABEL, TYP.
CONTOUR LABEL, TYP.
CONTOURS, TYP.
PROPERTY LINE, TYP.

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	7.26	POTENTIAL FOR DEVELOPMENT

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. WETLAND DATA APPROXIMATE, DERIVED FROM FIELD STUDY PERFORMED BY PND, SEPTEMBER 2025.

SITKA HIGH SCHOOL
TOTAL SUBJECT AREA: 7.26 ACRES

City and Borough of Sitka
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SCALE: SCALE IN FEET 0 50 100 FT.
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: SHS

PND PROJECT #: 242091 C.A.N. NO.: AECC250

2

N:\24XX\242091 CBS Land Suitability and Feasibility Study\6. Drawings\1. Design\1. Civil\CBS LAND SUITABILITY.dwg – Klundquist – 11/26/2025

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. AREA NOT INCLUDED IN WETLANDS STUDY WETLANDS MAY EXIST.

UPPER EDGECUMBE DRIVE

TOTAL SUBJECT AREA: 36.16 ACRES

GRADE TABLES

COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	-

DEVELOPMENT POTENTIAL

SITE	AREA (ACRES)	NOTES
1	4.39	POTENTIAL FOR DEVELOPMENT
2	9.26	POTENTIAL FOR DEVELOPMENT
3	22.51	LOW DEVELOPMENT POTENTIAL

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SCALE: SCALE IN FEET
0 150 300 FT.

DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: UPPER EDGECUMBE DRIVE

PND PROJECT #: 242091 C.A.N. NO.: AECC250

3

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GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. WETLANDS SHOWN ARE ASSUMED BASED ON LIMITED VISUAL OBSERVATIONS. ADDITIONAL WETLANDS MAY EXIST

BENCHLANDS
TOTAL SUBJECT AREA: 121.75 ACRES

LEGEND
- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	62.33	POTENTIAL FOR DEVELOPMENT
2	59.42	LOW DEVELOPMENT POTENTIAL

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SCALE: SCALE IN FEET 0 200 400 FT.
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: BENCHLANDS

PND PROJECT #: 242091 C.A.N. NO.: AECC250

4

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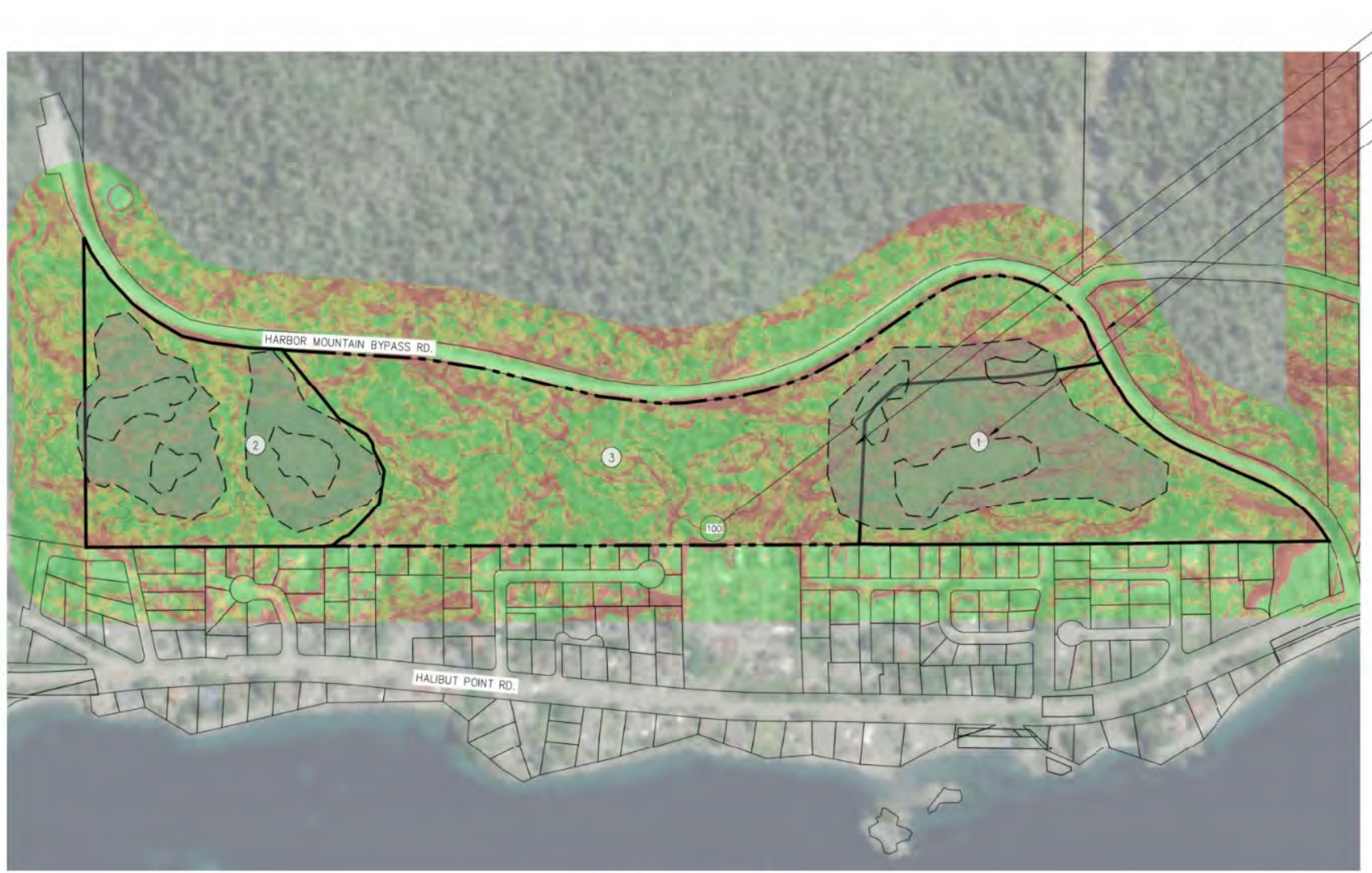

HARBOR MOUNTAIN ROAD
TOTAL SUBJECT AREA: 55.69 ACRES

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. WETLAND DATA APPROXIMATE, DERIVED FROM FIELD STUDY PERFORMED BY PND, SEPTEMBER 2025.

LEGEND

- STUDY BOUNDARY
- DEVELCPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	14.76	POTENTIAL FOR DEVELOPMENT
2	14.57	POTENTIAL FOR DEVELOPMENT
3	26.36	LOW DEVELOPMENT POTENTIAL

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DRAWN: ____ APPROVED: ____
SCALE: SCALE IN FEET 0 200 400 FT.
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: HARBOR MOUNTAIN ROAD

PND PROJECT #: 242091 C.A.N. NO.: AECC250

5

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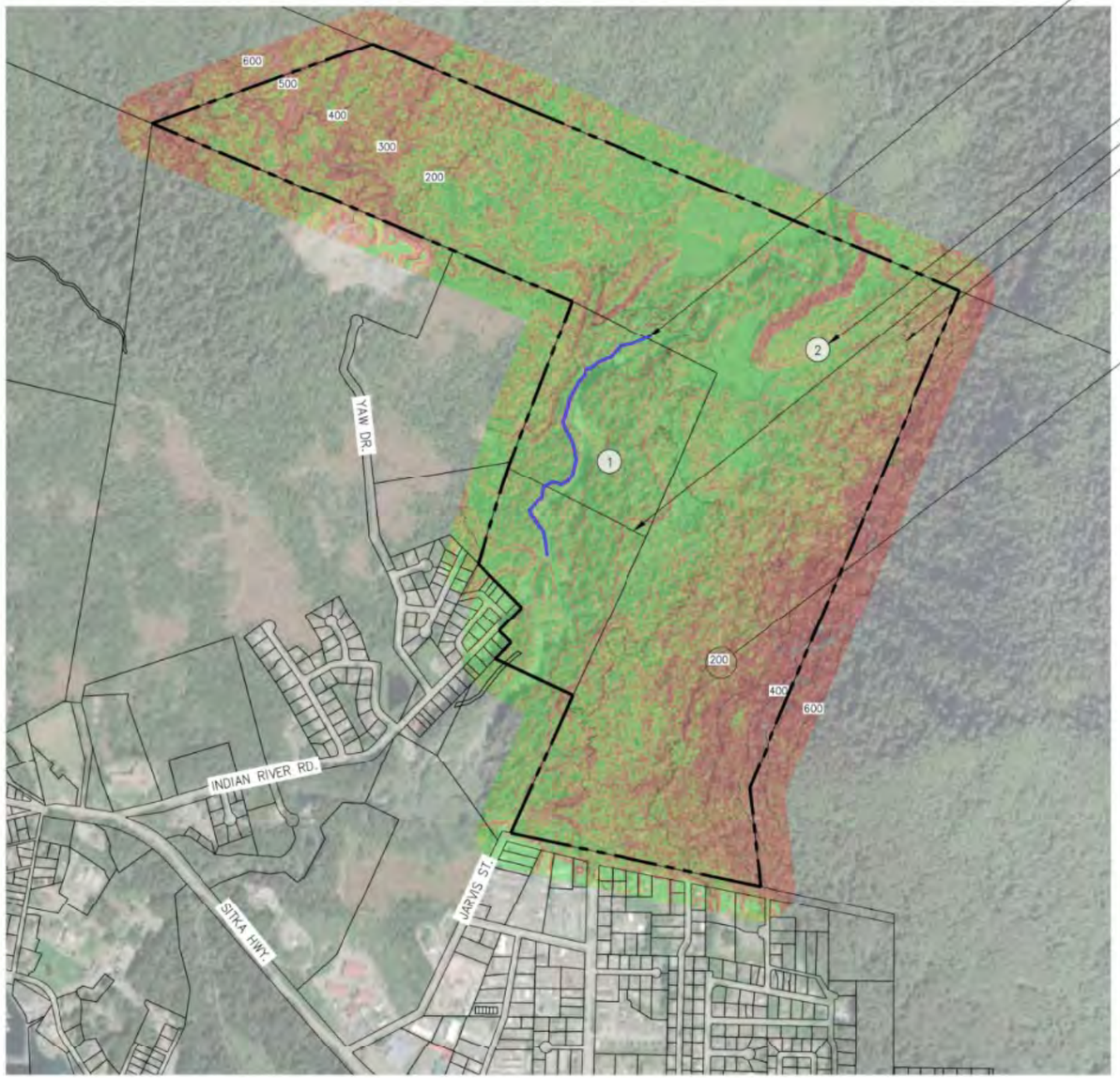

INDIAN RIVER

TOTAL SUBJECT AREA: 301.03 ACRES

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	56.81	CBS PARCEL
2	244.22	DNR PARCEL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. AREA NOT INCLUDED IN WETLANDS STUDY, WETLANDS MAY EXIST.

N:\24XXX\242091 CBS Land Suitability and Feasibility Study\G. Drawings\1. Design\1. Civil\CBS LAND SUITABILITY.dwg – Klundquist – 11/26/2025

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SCALE: SCALE IN FEET
0 500 1000 FT.

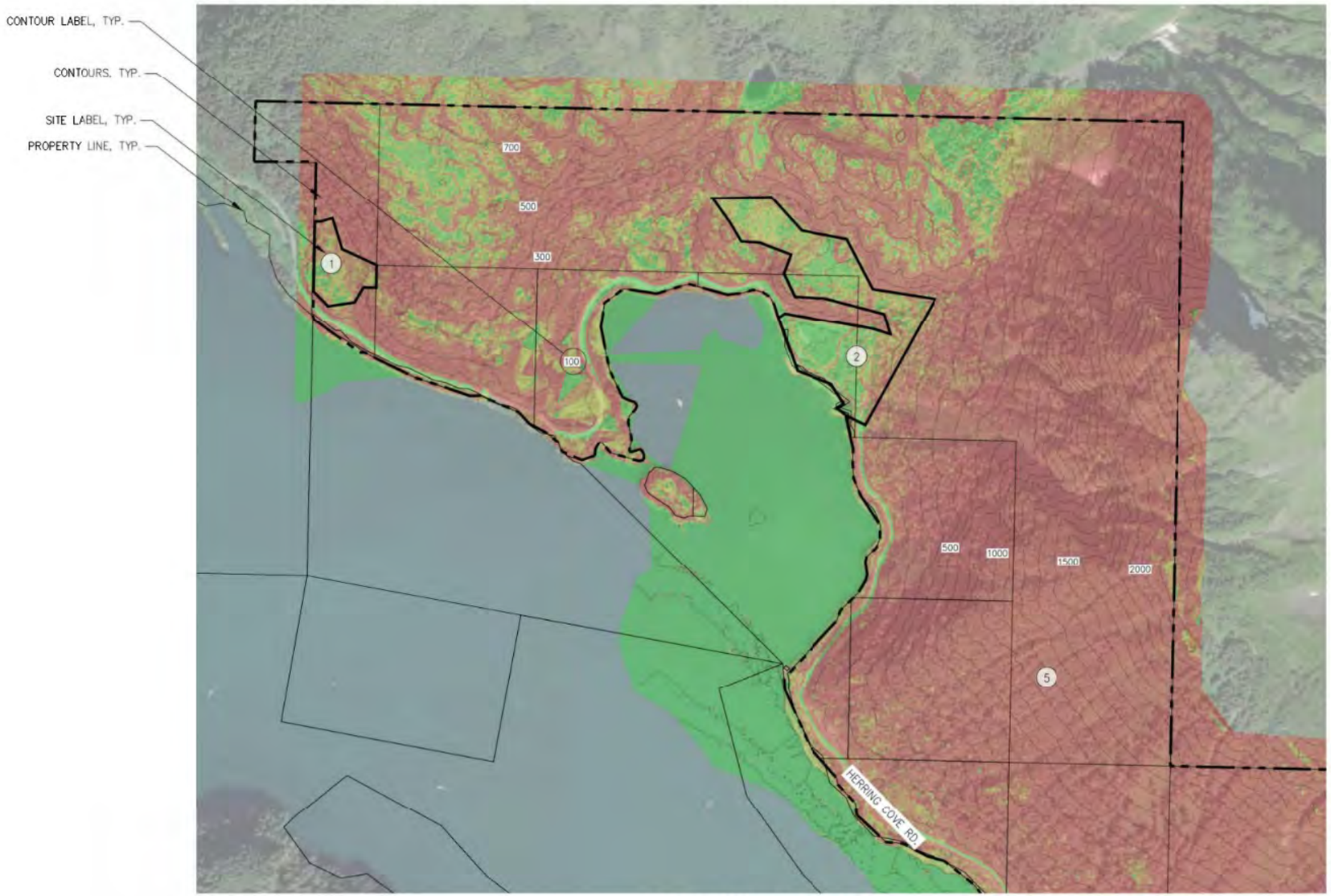
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: INDIAN RIVER

PND PROJECT #: 242091 C.A.N. NO.: AECC250

6



GREEN LAKE ROAD - PART 1

TOTAL SUBJECT AREA: 1157.60 ACRES

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	5.35	POTENTIAL FOR DEVELOPMENT
2	27.00	POTENTIAL FOR DEVELOPMENT
3	10.77	POTENTIAL FOR DEVELOPMENT
4	34.17	POTENTIAL FOR DEVELOPMENT
5	1080.31	LOW DEVELOPMENT POTENTIAL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. AREA NOT INCLUDED IN WETLANDS STUDY, WETLANDS MAY EXIST.

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City and Borough of Sitka

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SCALE: SCALE IN FEET
0 500 1000 FT.

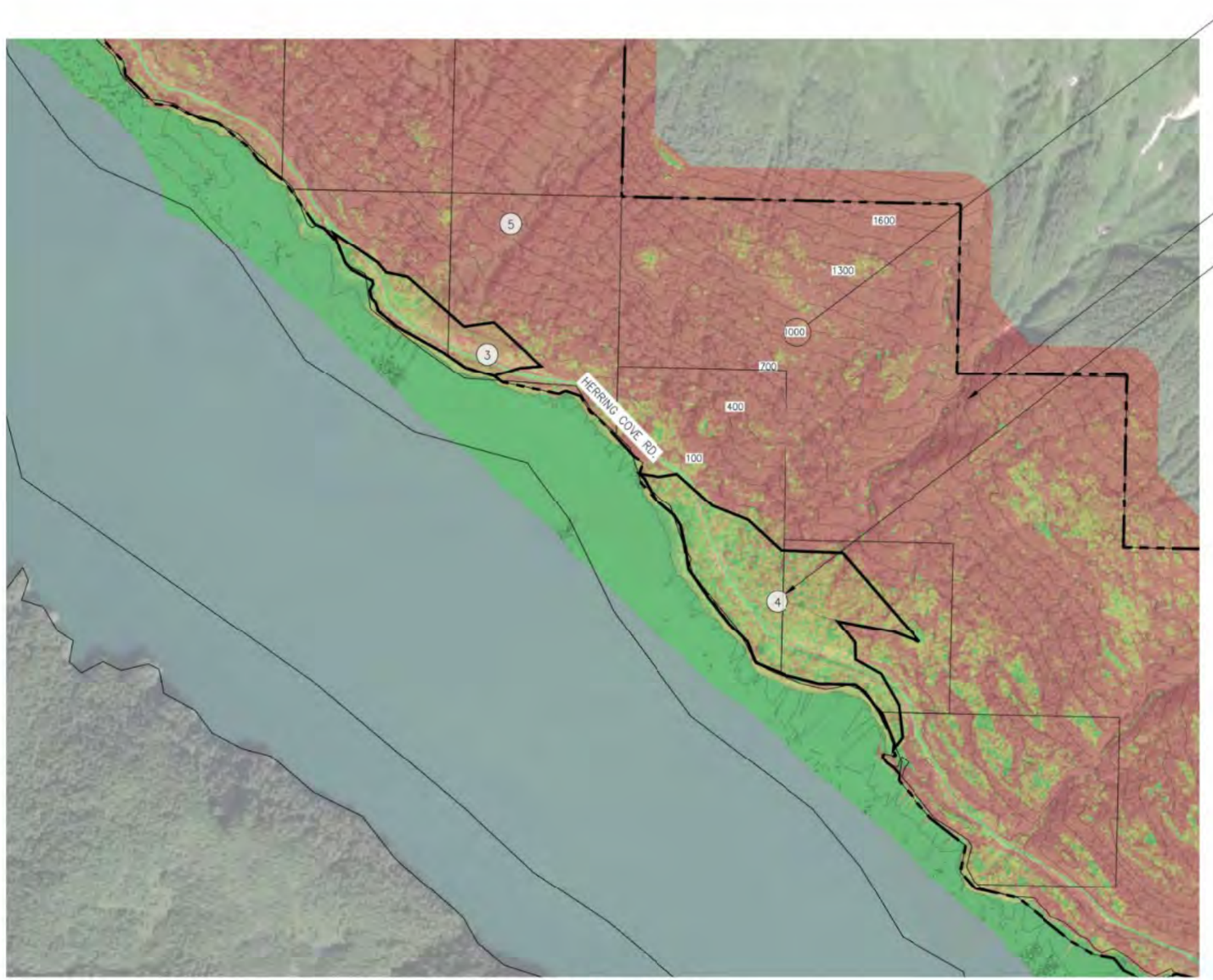
DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: GREEN LAKE ROAD - 1

PND PROJECT #: 242091 C.A.N. NO.: AECC250

7



LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES		
COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL		
SITE	AREA (ACRES)	NOTES
1	5.35	POTENTIAL FOR DEVELOPMENT
2	27.00	POTENTIAL FOR DEVELOPMENT
3	10.77	POTENTIAL FOR DEVELOPMENT
4	34.17	POTENTIAL FOR DEVELOPMENT
5	1080.31	LOW DEVELOPMENT POTENTIAL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.
2. AREA NOT INCLUDED IN WETLANDS STUDY, WETLANDS MAY EXIST.

GREEN LAKE - PART 2

TOTAL SUBJECT AREA: 1157.60 ACRES

N:\24XX\242091 CBS Land Suitability and Feasibility Study\6. Drawings\1. Design\1. Civil\CBS LAND SUITABILITY.dwg – Klundquist – 11/26/2025

City and Borough of Sitka

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www.pndengineers.com

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DRAWN: _____ APPROVED: _____

SCALE: SCALE IN FEET
0 500 1000 FT.

DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: GREEN LAKE ROAD - 2

PND PROJECT #: 242091 C.A.N. NO.: AECC250

8

OSPREY STREET
TOTAL SUBJECT AREA: 8.12 ACRES

LEGEND

- STUDY BOUNDARY
- DEVELOPED PUBLIC AREA BOUNDARY
- MAPPED WETLANDS

GRADE TABLES

COLOR	MINIMUM GRADE (%)	MAXIMUM GRADE (%)
	0%	15%
	15%	30%
	30%	45%
	45%	–

DEVELOPMENT POTENTIAL

SITE	AREA (ACRES)	NOTES
1	1.04	POTENTIAL FOR DEVELOPMENT
2	1.42	LOW DEVELOPMENT POTENTIAL

NOTE:

1. TOPOGRAPHIC DATA DEVELOPED FROM LIDAR.

N:\24XXX\242091 CBS Land Suitability and Feasibility Study\G. Drawings\1. Design\1. Civil\CBS LAND SUITABILITY.dwg – Klundquist – 11/26/2025

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SCALE: SCALE IN FEET
0 100 200 FT.

DATE: 11/26/2025

CITY AND BOROUGH OF SITKA, ALASKA
LAND SUITABILITY AND FEASIBILITY STUDY
TOPOGRAPHIC & DEVELOPMENT POTENTIAL MAPS

SHEET TITLE: OSPREY STREET

PND PROJECT #: 242091 C.A.N. NO.: AECC250

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Appendix D. Permitting Memo

PND ENGINEERS, INC.

MEMORANDUM

PROJECT NO. 242091 **DATE:** July 29, 2025

PROJECT: City and Borough of Sitka, Land Suitability and Feasibility Study

TO: Tyler Bradshaw, PND Engineers, Inc.

CC:

FROM: Danielle Schultz, PND Engineers, Inc.

SUBJECT: CBS Land Suitability and Feasibility Study Overview of Required Permits

This memorandum contains a summary of permits, regulations, and environmental factors relevant to the various sites included in the City and Borough of Sitka (CBS) Land Suitability and Feasibility Study. This evaluation is based on the selected parcels provided in the table below, and is subject to change as the concept evolves or new information is received. A list of permitting acronyms is also attached.

Primary permitting authority for projects in wetlands and waters of the U.S. (WOTUS) is primarily controlled by funding sources and the U.S. Army Corps of Engineers (USACE) regulatory process. USACE has jurisdiction over all structures within navigable waters and all projects impacting wetlands and WOTUS. However, if project funding comes from another Federal agency, the National Environmental Policy Act (NEPA) requires that agency to conduct an environmental review.

These processes are frequently coordinated between the participating federal agencies; however, an agency may delegate some of its responsibilities to the project owner or an owner's designated appointee. As a result, these timelines are heavily dependent on project details and funding sources. Additionally, the project's purpose and intended use can influence the permitting requirements.

Table 1: Project Parcel Options

Project Parcel Name	CBS Parcel Number	CBS Zoning Code
1. Gavin Hill	3-0280-000, 1-8600-000, 1-8650-000	P: Public lands
2. Gavin Hill SHS Property	1-7931-000	P: Public lands
3. Gavin Hill Extended	N/A	R1: Single-family and duplex manufactured home district
4. The Benchlands	N/A	R-1 PUD: Single-family and duplex residential planned unit development
5. Harbor Mountain Road	2-4940-000	R1: Single-family and duplex manufactured home district

Project Parcel Name	CBS Parcel Number	CBS Zoning Code
6. Indian River	1-8580-000, 3-0260-000, 3-0270-000	C1: General commercial and general commercial mobile home districts P: Public lands R2: Multi-family district
7. Green Lake Road	N/A	P: Public lands
8. Green Lake Road – Herring Cove Peninsula	N/A	P: Public lands
9. Osprey Street	1-5410-000	P: Public lands

1. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

If federal funding is sought for project development, the funding agency would be responsible for completion of the mandatory NEPA evaluation for all federal actions. Often, the responsibility for developing the associated documentation is delegated to the funding recipient. Because the specific project site has yet to be selected, the scope or magnitude of NEPA assessment could vary based on the final selected location.

If federal funding is not utilized, NEPA assessment would be required for any other federal action associated with the project. Most likely, this would be triggered by the issuance of the USACE permits and would therefore be incorporated into that process.

2. WETLANDS AND WOTUS

Due to the project location, there is a potential for impact to coastal wetlands and WOTUS at seven of the nine parcels. Preliminary mapping identifies "freshwater forested/shrub wetland," "riverine," "freshwater emergent," and "estuarine and marine" wetlands that may overlap with many of the project elements, depending on the final selected location. If the project were to proceed with a floating home structure for parcels 7 or 8, this would then overlap with "estuarine and marine deepwater" waters. *Early project work should include mapping and wetland delineation of any potentially affected areas to identify potential avoidance and minimization measures that could be incorporated into the project design.*

Development of onshore areas may require an assessment of wetland impacts. As described above, impacts to wetlands and WOTUS require authorization by USACE. Impacts to wetlands that cannot be avoided could require the payment of compensatory mitigation, according to pertinent USACE regulations and policies.

2.1 WETLANDS BY PARCEL

Due to the presence of wetlands on seven of the parcels, according to the National Wetlands Inventory (NWI), wetland delineations are suggested for parcels 1 through 7 where development may occur. Parcel 8, Green Lake Road – Herring Cove Peninsula, does not have wetlands within the boundaries, however, if the project proponent proceeds with a floating structure, that will be located above an Estuarine and

Marine Deepwater habitat, and additional compliance with the Clean Water Act will be required. Parcel 9 is fully inland and the NWI does not show any wetlands on the parcel.

Please note that the NWI mapper is not exact, and is suggested to be used only as a preliminary study tool. NWI maps are created using aerial imagery and limited field verification, and the NWI mapper does not constitute an official delineation of regulatory boundaries; wetland delineations will be required to identify specific wetland boundaries and types. Often, actual wetland areas determined under USACE's wetland criteria are significantly smaller than NWI mapped wetlands.

Some wetlands identified by the NWI mapper are in areas with steep slopes or that may otherwise be undevelopable (e.g. Green Lake Road). If CBS does not intend to develop land in the vicinity of specific mapped wetlands, delineation would not be needed at those locations. It is PND's recommendation that CBS conduct field delineations only in areas that may be developed.

For more information on wetlands by parcel, see **Table 2** below, and the breakdown of wetlands by parcel in the Appendix.

Table 2: Wetland Presence by Parcel

Parcel	Wetlands Present?	Type of Wetlands (with Cowardin Classification Code)	Notes
Gavin Hill	Yes	Riverine (R5UBH), Freshwater Forested/Shrub Wetland (PFO4B, PSS1/EM1B, PSS1/FO4B), Freshwater Emergent Wetland (PEM1/SS1B)	
Gavin Hill SHS Property	Yes	Freshwater Forested / Shrub Wetland (PFO4B and PSS1/FO4B)	
Gavin Hill Extended	Yes	Freshwater Forested/ Shrub Wetland (PFO4B)	
The Benchlands	Yes	Freshwater Forested/ Shrub Wetland (PFO4B)	
Harbor Mountain Road	Yes	Freshwater Forested/ Shrub Wetland (PFO4B and PSS1/EM1C)	
Indian River	Yes	Freshwater Forested/ Shrub Wetland (PFO4B, PSS1/EM1B), Riverine (R3UBH, R3USA, R5UBH), Freshwater Emergent Wetland (PEM1F)	
Green Lake Road	Yes	Freshwater Forested/ Shrub Wetland (PFO4B, PSS4/1B, PSS4/EM1B, PSS1B, PFO4B/SS4B), Freshwater Pond (PUBH), Estuarine and Marine Wetland (E2USN), Riverine (R5UBH, R4SBA), Estuarine and Marine Deepwater (E1UBL)	Large area, potential to be able to avoid wetlands due to large size of parcel, may still require delineation to determine best locations.

Parcel	Wetlands Present?	Type of Wetlands (with Cowardin Classification Code)	Notes
Green Lake Road – Herring Cove Peninsula	No	-	No wetlands on parcel; waterfront site (estuarine and marine deepwater)
Osprey Street	No	-	

Note that everything in the above table is based on the National Wetlands Inventory Mapper which is not exact. If NWI indicates that wetlands may be present on, or close to, developable areas of a parcel, a wetland delineation is encouraged to determine specific boundaries.

2.2 COMPENSATORY MITIGATION BANKING

Projects with unavoidable effects to wetlands and WOTUS are required to offset those effects through the purchase of mitigation credits or, in the absence of available credits, the performance of permittee-responsible mitigation under USACE's supervision.

When available, the purchase of credits from a mitigation bank is the preferred mitigation pathway from USACE. After conducting a search through USACE's RIBITS (Regulatory In-lieu Fee and Bank Information Tracking System), there are two mitigation banks serving the greater Sitka area, covering all project parcels that may overlap with wetlands: Natzuhini Bay Mitigation Bank and Trillium Mitigation Bank. The lead applicant must request quotes from the mitigation bank to fully understand the amount of credits needed to offset any project impact, and the associated costs.

Wetland areas determined under USACE's wetland criteria are often significantly smaller than NWI mapped wetlands, and the costs of a field delineation are typically offset and exceeded by reduced mitigation costs.

3. PROTECTED SPECIES CONSIDERATIONS

In addition to the process described above and depending on the selected parcel for the project, the project may require reviews under the Endangered Species Act (ESA), regarding Essential Fish Habitat (EFH), and for potential Marine Mammal Protection Act (MMPA) impacts.

For the proposed action, impacts to protected species in the vicinity could largely be mitigated through avoidance and minimization measures, including work during low tide. However, consultation may be required with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). If impacts cannot be avoided or rise above the "not likely to adversely affect" threshold for protected species, the project could require additional permits that would significantly increase the permitting timeline. Impacts that could reach this threshold include underwater pile driving in the presence of marine mammals or potential contaminated dredged or excavated materials.

Table 3 presents the protected marine species found at/near the associated project parcel. Project parcels #1, 2, 3, 5 and 6 do not have ESA or MMPA-protected species in the project areas, and would not require the associated consultations. Additional listed species have ranges overlapping the project area and may require consultation but aren't likely to be present during project construction. Management of marine mammals falls under the jurisdiction of NMFS and USFWS, depending on the species affected.

Table 3. Protected species within range of project construction.

Species	Scientific Name	Site	Listing Status	Managing Agency
Humpback whale	*Megaptera novaeangliae*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	ESA endangered	NMFS
Steller sea lion (Western DPS)	*Eumetopias jubatus*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	ESA endangered	NMFS
Sunflower sea star	*Pycnopodia helianthoides*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	ESA proposed threatened	NMFS
Gray whale	*Eschrichtius robustus*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	MMPA protected	NMFS
Killer whale	*Orcinus orca*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	MMPA protected	NMFS
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	MMPA protected	NMFS
Harbor porpoise	*Phocoena phocoena*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	MMPA protected	NMFS
Steller sea lion (Eastern DPS)	*Eumetopias jubatus*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	MMPA protected	NMFS
California sea lion	*Zalophus californianus*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	MMPA protected	NMFS
Northern fur seal	*Callorhinus ursinus*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	MMPA protected	NMFS
Harbor seal	*Phoca vitulina richardii*	7. Green Lake Road* 8. Green Lake Road – Herring Cove*	MMPA protected	NMFS
*Consultation for the associated species at this site will only be necessary if the project proceeds with the floating home structures, as this will require in-water-work. If the project proceeds at this site on land, consultation may not be necessary (it will be dependent on the full scope and potential impacts).				

Project parcels 1 and 4 have documented bald eagle nests within the parcel bounds in 1997 (parcel #1) and 1985, 2000, and 2011 (parcel #4). As eagles are widespread throughout Southeast Alaska, an eagle

nest survey is suggested for any of the selected parcels to prevent incidental take of bald eagles; destruction of active bird nests, eggs, or nestlings from vegetation clearing and construction activities would be a violation of the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Additionally, following the land clearing timing guidance can further prevent incidental take of eagles. For Southeast Alaska, it is recommended to avoid vegetation clearing from April 15 through July 15 for forest or woodland areas, and May 1 through July 15 for shrub or open areas (USFWS 2009)[1].

Salmon and other anadromous fish are protected as a resource by the State of Alaska and other fisheries are protected under the relevant Fishery Management Plan (FMP) by NOAA Fisheries. Any project occurring in fish habitat is required to receive review by the Alaska Department of Fish & Game (ADF&G) and NOAA Fisheries. Required mitigation for sensitive fish populations during in-water construction typically includes efforts to reduce noise levels, adjusting project timing of work around important fish runs, and potential use of silt curtains to contain turbidity. Fish species at various life stages within the Gulf of Alaska Groundfish and Salmon FMPs are present in Herring Cove within the project area of parcels 7 and 8 (if the floating house structure were to be selected), and within anadromous streams in the project areas of parcels 1 (Gavin Hill), 6, (Indian River), and 7 (Green Lake); an EFH assessment report may be required to determine the impact of the project on these species and the associated EFH.

4. FLOODPLAINS

As a coastal community, sections of the Borough lie within floodplains; the Alaska State Legislature has delegated the authority of floodplain management to the respective communities. In the Borough, restrictions on development within specific floodplain zones are only applicable to those within the Flood Hazard District. The Flood Hazard District includes all areas within CBS subject to one percent or greater chance of flooding in any given year as delineated in the FEMA Flood Insurance Rate Map (FIRM). None of the nine project parcels fall into this category; they are all categorized under “X” (area of minimal flood hazard), or “D” (area of undetermined flood hazard). In “X” areas, additional, floodplain-specific construction regulations and permits would not be applicable. In “D” areas the Floodplain Manger may require additional hydrologic studies to determine flood plain boundaries. The Parcels 1 and 2, were identified by the CBS floodplain manager as areas where additional study may be warranted.

5. WASTEWATER AND STORMWATER

Public water and wastewater systems require plan reviews and Approval to Construct and Approval to Operate authorizations from the Alaska Department of Environmental Conservation (ADEC). Following design of any proposed toilets and domestic facilities, they should be assessed for potential requirements under (ADEC) policies and plans review procedures under Alaska Administrative Code (AAC) Title 18 – Environmental Conservation.

If the project impact site exceeds 1 acre, a stormwater pollution prevention plan (SWPPP) will be required. Stormwater systems require a Plan Review and Letter of Non-Objection by ADEC prior to construction.

[1] USFWS. 2009. LAND CLEARING TIMING GUIDANCE FOR ALASKA. U.S. DEPARTMENT OF THE INTERIOR, FISH & WILDLIFE SERVICE.

6. CBS CODES

Appropriate permits must be obtained from CBS prior to construction commencement. A foundation permit will be required to ensure the designed structure meets seismic standards. The project will also require a building and grading permit. While these are two separate permits, they utilize the same application, available on the CBS website under the building department page. The grading permit application will need to be supported with documentation that includes written explanation of fill and excavation quantities. Site plans showing underground utilities, structures within 15 feet, section view(s), and limits of proposed cuts and fills will also be required. A disposal site for excavated materials must be determined at the time of permit application.

The building permit will also require supporting documentation including a written statement of the project's intended purpose, floor plans of the proposed facility, and elevation views. Electrical, lighting, mechanical, and plumbing plans must be included with the building permit application. The building permit package should include any additional construction details not previously submitted with the grading/foundation permit application.

In addition to the permits addressed above, a CBS utilities connection permit will be required to establish utility connections to the new building. All fire systems are to include fire alarms, sprinklers, and fire suppression; they are subject to state law. The State of Alaska Fire Marshal has deferred fire, public safety, and occupancy approvals to the CBS building department. Finally, as a residential property, the building must adhere to residential-specific codes and standards, outlined on their website.

7. LAND JURISDICTION

Permitting processes are also heavily influenced by the land jurisdictions occurring within the project site. Submerged tidelands within Alaska are generally under State jurisdiction unless otherwise leased or ceded. If an existing agreement is not already in place for the area to be developed, a tidelands lease or conveyance would be required for the project. (Tidelands cannot be conveyed to private entities, corporations, or villages, but can be conveyed to a cooperating municipality or borough). Early consultation with the Alaska Department of Natural Resources (ADNR) regarding tidelands use is recommended.

An active tidelands lease (ADL 106345) exists in the waters off parcel #8, which is being considered as a site for both land construction and floating home structures. These tidelands may have to be conveyed in order to construct floating structures in that location.

Additionally, permitting for construction in the tidelands requires the cooperation and approval of the adjacent uplands' landowner(s). Clear titles would need to be established for any uplands development planned in conjunction with the project construction.

8. SUMMARY

A preliminary list of potential permits and approvals for the project is shown in the table below. Permitting timelines assume completion to a design level necessary to thoroughly assess potential environmental impacts (typically at least 35% unless additional specific details are required).

Potential challenges in the permitting process may arise due to a few factors: the funding source, work in wetlands or WOTUS, and effects to protected species. If the project is to be funded by any federal agency, the project must go through the NEPA process. This can require significant time and effort.

In the event a parcel is selected that may have wetlands or WOTUS within or adjacent to the project area, this will likely trigger the need for a USACE permit and could potentially require a wetland delineation. Depending on the final scope, and other necessary permits, the USACE permit review process could take anywhere from approximately three to nine months.

Finally, the construction of the floating home structures in either parcels 7 or 8 has more potential to impact protected species than the proposed upland housing structures. In-water work within Herring Cove will likely require consultations with NMFS under the ESA, Magnuson–Stevens Fishery Conservation and Management Act (MSA), and MMPA. These consultations, depending on the full project scope and anticipated impacts, can take anywhere from 3 to 18 months.

Finally, if constructing the float homes is to occur within parcel 8, a tidelands lease or conveyance from ADNR will be required. This can take approximately 18 to 24 months.

For a streamlined process with a comparatively shorter review process, and will require less labor in preparing the necessary permitting materials, we recommend selecting a parcel and scope that avoids in-water work, work in or near wetlands, and planning for upland housing structures (as opposed to the floating homes structure).

The parcels that will require the least amount of permitting are parcels 4 (the Benchlands), 5 (Harbor Mountain Road), and 9 (Osprey Street). All three will require the three local CBS permits discussed above (as will all of the parcel options) and may require an ADEC 401 permit and a SWPPP, depending on the final scope. Project construction may also require a NEPA process, if there is federal involvement.

Once 35% design is completed, we recommend holding a pre-permitting consultation with the relevant permitting agencies. It is often beneficial to gather these representatives together to facilitate coordination and cooperation as well as increase early buy-in to the project. Major permitting milestones are expected to require at least two years from notice to proceed with site investigation and design services. Descriptions of each of the likely permits anticipated follow in Table 4.

Table 4. Permits and authorizations anticipated for this project.

Agency	Code	Permit/Authorization	Timeline	Applicable Parcels
Lead Federal Agency	National Environmental Policy Act (NEPA)	NEPA assessment is the responsibility of the lead Federal agency. If multiple agencies contribute significant project funds or have other substantial authority, cooperative assessment may be warranted. If Federal funds are utilized to construct a project, the funding agency would lead the NEPA assessment, although this is often delegated to tribal authorities in the case of tribal grant-funded projects.	NEPA process timing varies widely depending on the type (i.e., Federal funds or permit), scope, or size of the triggering action. Typical timeline for: · Categorical Exclusion (if available) is 4 – 8 months · Environmental Assessment is 6 – 18 months · Environmental Impact Statement is 1 – 3 years	All parcels, if working with a federal agency.

Agency	Code	Permit/Authorization	Timeline	Applicable Parcels
		When triggered by USACE permitting action, NEPA assessment is usually performed by USACE in conjunction with the DAP.		
USACE	**Department of the Army Permit (DAP)**			
	Clean Water Act (CWA)	Regulates discharge of dredged or fill material into waters of the United States, including wetlands. · Section 404; Permits for Dredged or Fill Material	· 3 weeks – 9 months for a DAP (Typically this is constrained by ESA or MMPA requirements. Most USACE permits from USACE are completed within 2 weeks of these consultations). · If an IHA or LOA is required, the DAP would be issued following approval of the permit.	Parcels #1-8, if wetland delineation finds wetlands. Parcels #7 and #8 if building over-water structures.
NMFS	Endangered Species Act (ESA)	Requires consultation with the protected species management divisions of both USFWS and NMFS for potential effects to ESA-listed species.	· 3 – 9 months for informal consultation (assuming no site studies are required and that shutdown can mitigate effects of pile-driving). · 9 – 12 months from initiation typical for formal consultation (pile-driving)	Parcels #7 and #8 if building over-water structures.
	Magnuson–Stevens Fishery Conservation and Management Act (MSA)	Requires consultation with NMFS regarding Essential Fish Habitat (EFH), if project activities affect marine waters or habitat important to fish rearing.	Consultation would likely be included with ESA and NEPA considerations.	Parcels #7 and #8 if building over-water structures.
	Marine Mammal Protection Act (MMPA)	Requires consultation with NMFS regarding the issuance of an IHA or LOA if effects on marine mammals are anticipated (pile-driving).	· 9 – 12 months from application typical for an IHA · 12 – 18 months from application for an LOA	Parcels #7 and #8 if building over-water structures.
USFWS	Endangered Species Act (ESA)	Requires consultation with the protected species management divisions of both USFWS and NMFS	· 3 – 9 months (assuming no site studies are required).	
	Migratory Bird Treaty Act (MBTA)	Requires consideration of potential impacts to migratory birds.	Consultation would likely be included with ESA and NEPA considerations.	Parcels #1 and #4, suggest to conduct Bald Eagle survey for all parcels.

Agency	Code	Permit/Authorization	Timeline	Applicable Parcels
ADEC	Clean Water Act (CWA)	Section 401 [Water Quality] Certification. Regulates State certification of Federal CWA permits.	Consultation is typically completed within Section 404 permit timeline.	Design dependent for each parcel.
	18 AAC 83 Alaska Pollution Discharge Elimination System Program, Construction General Permit	Alaska Pollution Discharge Elimination System (APDES) permit program implementing CWA Section 402 requirements. Permit type depends on area of ground to be disturbed. Affected projects require Stormwater Pollution Prevention Plan (SWPPP) and Notice of Intent filed with ADEC.	Notice of Intent required for project footprints exceeding one acre.	Design dependent for each parcel.
	18 AAC 70 Water Quality	Antidegradation Analysis (with CWA permit application or APDES permit)	Analysis is integrated with the CWA Section 401 process.	Design dependent for each parcel.
ADF&G	AS 16.05.871-.901 Protection of fish and game (Anadromous Fish Act)	Permit required for actions that alter or affect "the natural flow or bed" of a specified waterbody or fish stream.	For projects with typical fish habitat and conditions, permit review requires 3 – 6 weeks on average. For marine projects, anadromous fish impacts are assessed via consultation with USACE. Process is typically complete within DAP permitting. This may require stipulations for project timing to protect fish runs.	Design dependent, potential requirement for Parcels #1, #6, #7
	AS 16.05.841 Fishway required	Permit required for activities within or across a stream used by fish if it is determined such uses could represent an impediment to efficient passage of resident or anadromous fish.		Design dependent, potential requirement for Parcels #1, #6, #7
ADNR DMLW	11 AAC 96.010 Uses requiring a permit	Permits, leases, and easements for use of State lands, including submerged lands or tidelands.	· Temporary Land Use permits generally require 4 - 8 weeks. · Tideland lease requires several months to a year for initial processing and survey. · Finalization of a State lands lease follows construction & as-built survey and typically takes several years.	Potentially for Parcel #8 if proceeding with floating structure.

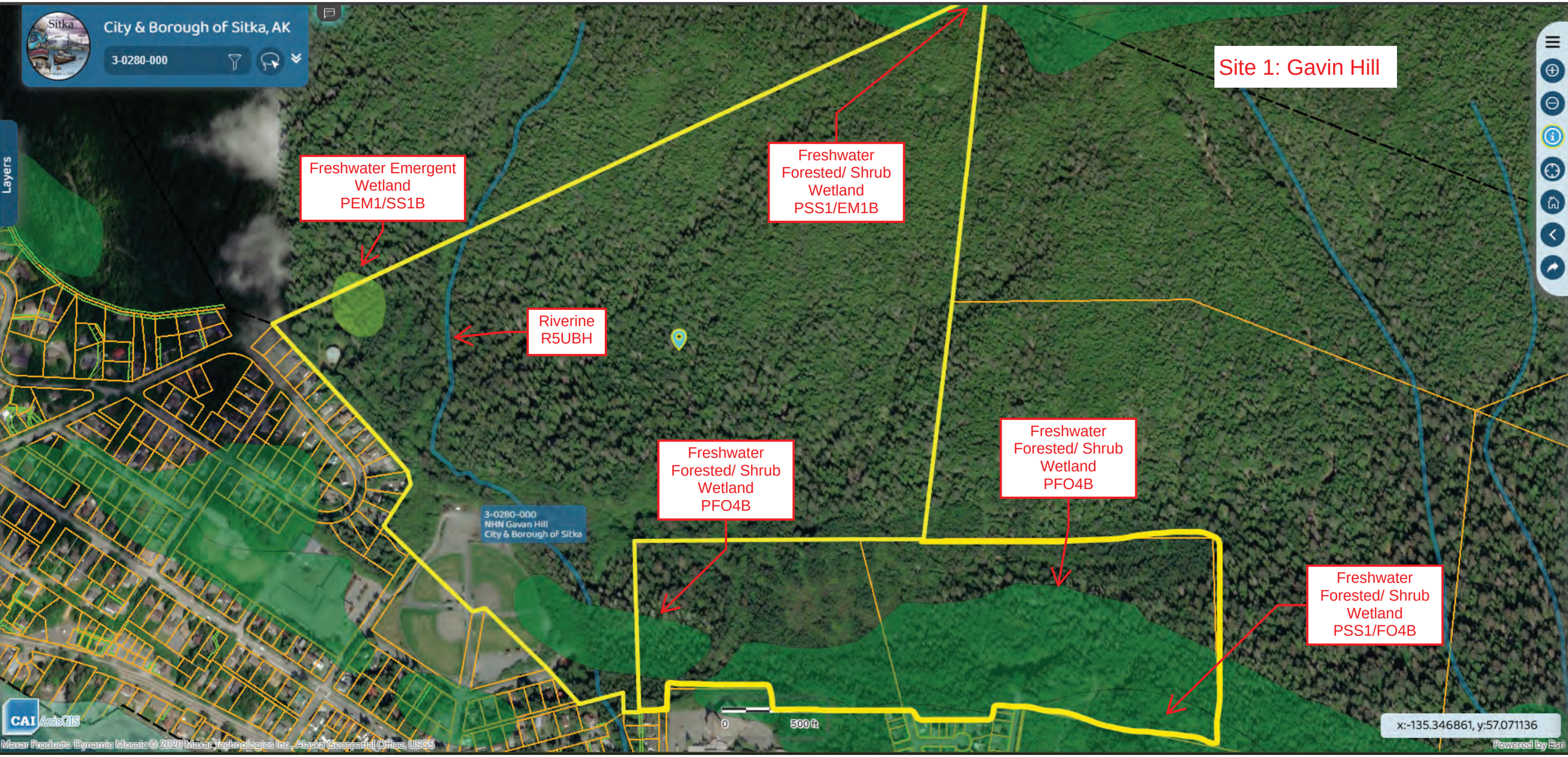
Agency	Code	Permit/Authorization	Timeline	Applicable Parcels
	AS 38.05.825 Conveyance of tide & submerged land to municipalities	Tidelands conveyance of state lands to municipalities or boroughs	Tidelands conveyance required for municipality to obtain the land if it is under state ownership. Public process can require 18 – 24 months.	Potentially for Parcel #8 if proceeding with floating structure.
	11 AAC 93.035 (a)(b) and 11 AAC 93.220	Temporary Water Use Authorization for water withdrawals, including diversions, impoundments, and in source uses.		Potentially for Parcels #1, #6, and #7, depending on design.
City and Borough of Sitka (CBS)	CBS Building Code	Foundation Permit	Available on CBS website under the Building Department section.	All parcels.
		Building and Grading Permit		All parcels.
		Utilities Connection Permit		All parcels.

Table 5. Acronyms and abbreviations used in this document.

Acronym	Text
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish & Game
ADNR	Alaska Department of Natural Resources
APDES	Alaska Pollutant Discharge Elimination System
AS	Alaska Statute
BGEPA	Bald and Golden Eagle Protection Act
CBS	City and Borough of Sitka
CWA	Clean Water Act
DAP	Department of the Army Permit
DMLW	Division of Mining Land & Water
DPS	Distinct population segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act

Acronym	Text
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMP	Fishery Management Plan
IHA	Incidental Harassment Authorization (MMPA)
LOA	Letter of Agreement
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PND	PND Engineers, Inc.
RIBITS	Regulatory In-lieu Fee and Bank Information Tracking System
SWPPP	Stormwater Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish & Wildlife Service
WOTUS	Waters of the United States

Appendix A. Wetlands by Parcel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Freshwater Forested/ Shrub Wetland PSS1/EM1B
Riverine R5UBH
Freshwater Forested/ Shrub Wetland PFO4B
Freshwater Forested/ Shrub Wetland PFO4B
Freshwater Forested/ Shrub Wetland PSS1/FO4B
3-0280-000
NHN Gavan Hill
City & Borough of Sitka
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Powered by Esri
Maxar Products- Dynamic Mosaic © 2020 Maxar Technologies Inc., Alaska Geospatial Office, USGS


City & Borough of Sitka, AK
1-7931-000
Site 2: Gavin Hill, SHS
Freshwater
Forested/Shrub Wetland
PFO4B
Freshwater
Forested/Shrub Wetland
PSS1/FO4B
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SITKA
HIGH
SCHOOL
1000
VERSTOVIA STREET
DAVIT CIRCLE
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Maxar Products, Dynamic Mosaic © 2020 Maxar Technologies Inc., Alaska Geospatial Office, USGS
Powered by Esri


City & Borough of Sitka, AK
1-7931-000
Layers
Site 3: Gavin Hill Extended
Freshwater
Forested/ Shrub
Wetland
PFO4B
Freshwater
Forested/ Shrub
Wetland
PFO4B
0
500 ft
CAI AxisGIS
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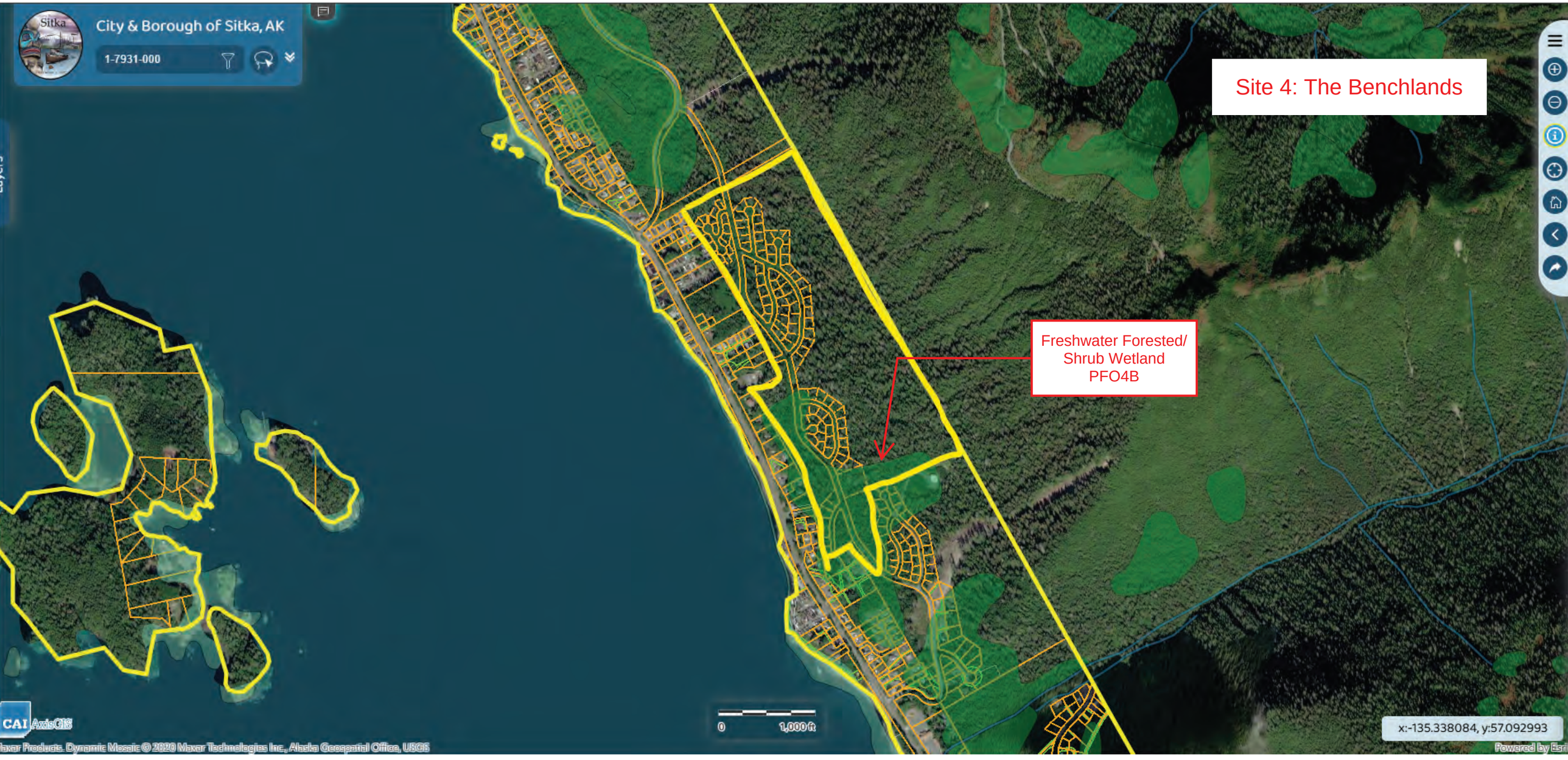
Powered by Esri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Shrub Wetland
PFO4B
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Powered by Esri
Maxar Products, Dynamic Mosaic © 2020 Maxar Technologies Inc., Alaska Geospatial Office, USGS


City & Borough of Sitka, AK
2-4940-000
Layers
Site 5: Harbor Mountain Road
Freshwater forested/ shrub wetland PFO4B
Freshwater forested/ shrub wetland PFO4B
Freshwater forested/ shrub wetland PSS1/EM1C
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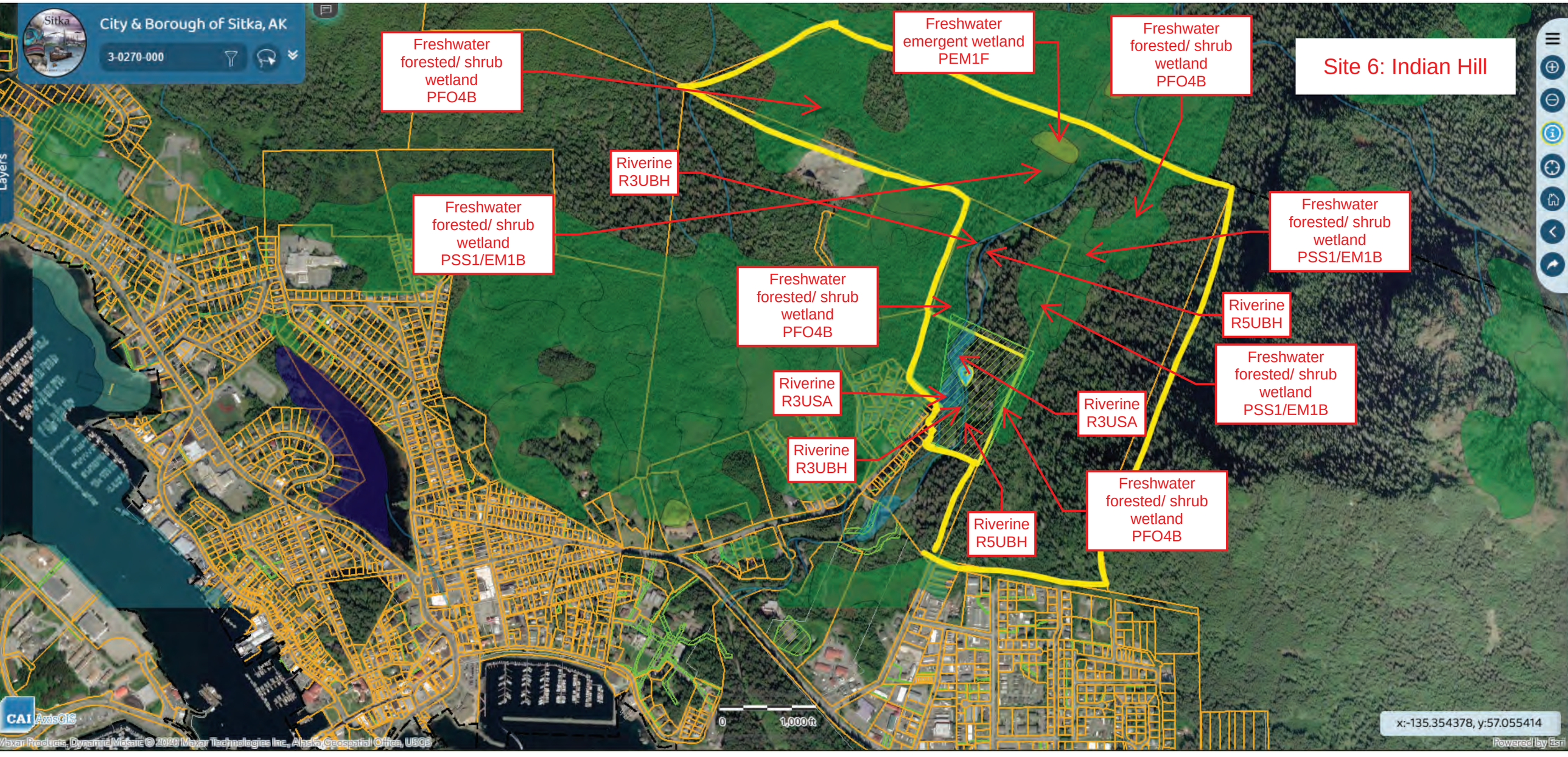
Maxar Products, Dynamic Mosaic © 2020 Maxar Technologies Inc., Alaska Geospatial Office, USGS
CAI AxisGIS


City & Borough of Sitka, AK
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Site 6: Indian Hill
Freshwater forested/ shrub wetland PFO4B
Freshwater emergent wetland PEM1F
Freshwater forested/ shrub wetland PFO4B
Riverine R3UBH
Freshwater forested/ shrub wetland PSS1/EM1B
Freshwater forested/ shrub wetland PSS1/EM1B
Freshwater forested/ shrub wetland PFO4B
Riverine R5UBH
Riverine R3USA
Freshwater forested/ shrub wetland PSS1/EM1B
Riverine R3USA
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Riverine R5UBH
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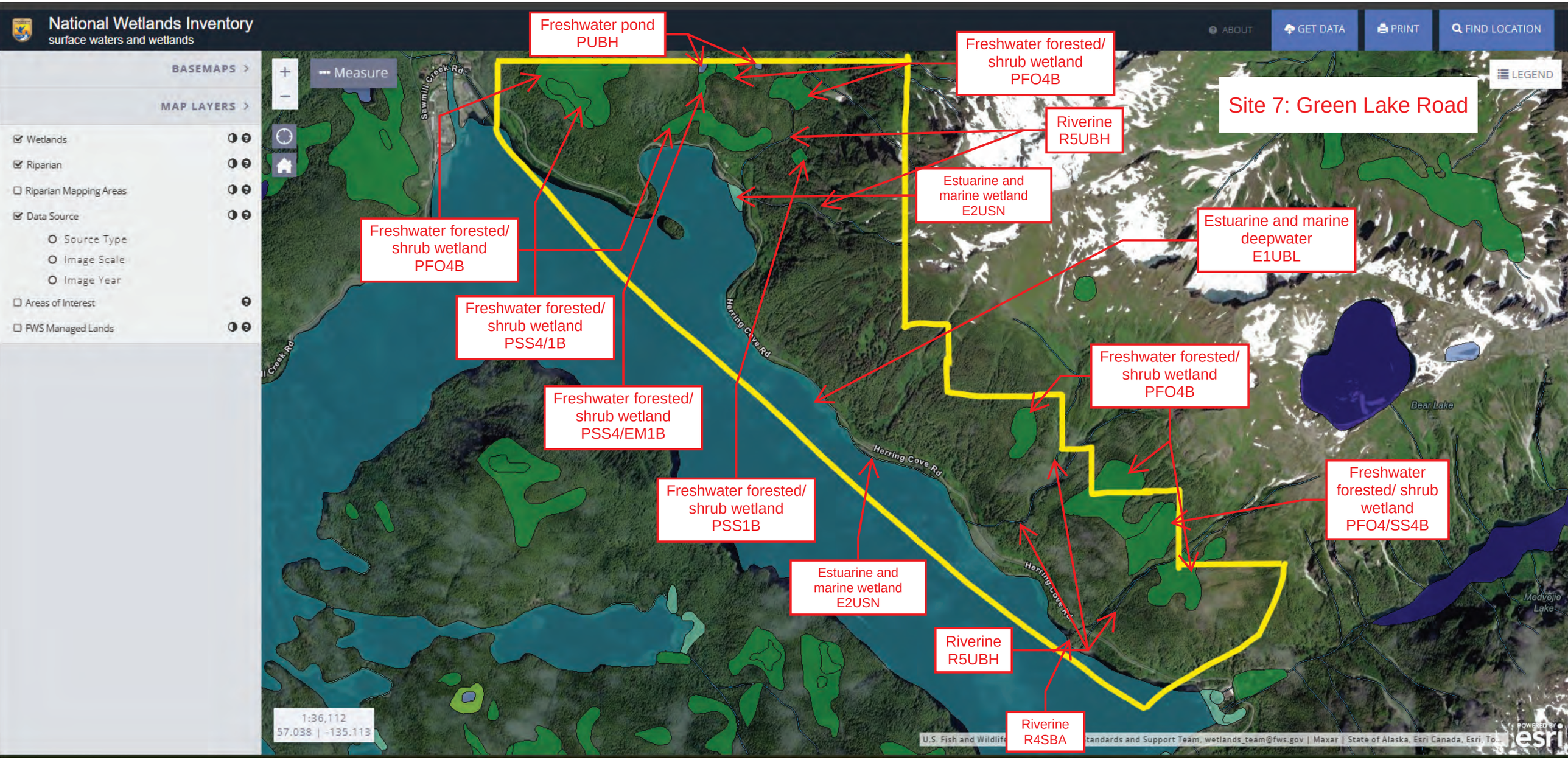
Maxar Products, Dynamic Mosaic © 2020 Maxar Technologies Inc., Alaska Geospatial Office, USGS


National Wetlands Inventory
surface waters and wetlands
ABOUT
GET DATA
PRINT
FIND LOCATION
BASEMAPS
MAP LAYERS
Wetlands
Riparian
Riparian Mapping Areas
Data Source
Source Type
Image Scale
Image Year
Areas of Interest
FWS Managed Lands
Measure
LEGEND
Site 7: Green Lake Road
Freshwater pond
PUBH
Freshwater forested/
shrub wetland
PFO4B
Riverine
R5UBH
Estuarine and
marine wetland
E2USN
Estuarine and marine
deepwater
E1UBL
Freshwater forested/
shrub wetland
PFO4B
Freshwater forested/
shrub wetland
PSS4/1B
Freshwater forested/
shrub wetland
PSS4/EM1B
Freshwater forested/
shrub wetland
PSS1B
Estuarine and
marine wetland
E2USN
Riverine
R5UBH
Riverine
R4SBA
Freshwater
forested/ shrub
wetland
PFO4/SS4B
Sawmill Creek Rd
Herring Cove Rd
Bear Lake
Medvejie
Lake
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57.038 | -135.113
U.S. Fish and Wildlife
tandards and Support Team, wetlands_team@fws.gov | Maxar | State of Alaska, Esri Canada, Esri, To...
esri


City & Borough of Sitka, AK
3-0270-000
Layers
Site 8: Green Lake Road
- Herring Cove
Sawmill Creek Road
Estuarine and Marine
Deepwater
E1UBL
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200 ft
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Maxar Products. Dynamic Mosaic © 2020 Maxar Technologies Inc., Alaska Geospatial Office, USGS
Powered by Esri


City & Borough of Sitka, AK
1-5410-000
Site 9: Osprey Street
No wetlands on site
Estuarine and marine deepwater E1UBL
THOMSEN HARBOR
OLGA STREET
LAKEVIEW DRIVE
CRABAPPLE DR
LAKEVIEW DR
HALIBUT POINT ROAD
MARINE STREET
OSPREY STREET
BLATCHLEY MIDDLE SCHOOL
SAWMILL CREEK ROAD
KASHEVAROFF ST
MARINE SERVICE CENTER
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100 ft
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Powered by Esri
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AxisGIS

Appendix E. Wetland Reconnaissance and Delineation Report

Prepared for:

City and Borough of Sitka

100 Lincoln Street
Sitka, AK 99835

November 2025

City & Borough of Sitka Land Suitability and Feasibility Study

Wetland & Stream Reconnaissance & Delineation

Prepared By:

PND Engineers, Inc.
1506 W 36TH Ave.
Anchorage, AK 99503

PND ENGINEERS, INC.

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ACRONYMS AND ABBREVIATIONS

A1	histosol or histel soils indicator
A2	histic epipedon soils indicator
A4	hydrogen sulfide soils indicator
ADF&G	Alaska Department of Fish & Game
AWC	Anadromous Waters Catalog
CBS	City and Borough of Sitka
Data Forms	Alaska Region Wetland Determination Data Forms
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
ft	Feet
GIS	Geographical Information System
GPS	global positioning system
HUC	hydraulic unit code
NOAA	National Oceanographic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
OBL	obligate (wetland)
PEM1B	Palustrine Persistent Emergent
PFO4B	Palustrine Forested Wetland, Needle-Leaved Evergreen
PND	PND Engineers, Inc.
POC	point of contact
PSS4B	Palustrine Scrub Shrub Wetland, Needle-Leaved Evergreen
Regional Supplement	*Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2)*
RIBITS	Regulatory In-lieu Fee and Bank Information Tracking System
SHS	Sitka High School
TP	test pit
UPL	upland
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
W	wetland
WOTUS	waters of the United States

1.0 INTRODUCTION

PND Engineers, Inc. (PND) was contracted by the City and Borough of Sitka (CBS) to conduct a wetland reconnaissance across various parcels in Sitka, AK. CBS wishes to study municipal land to determine the feasibility of constructing residential housing.

PND environmental scientists were contracted to perform a reconnaissance study across several subject parcels to confirm the three U.S. Army Corps of Engineers (USACE) parameters, and to map Peterson Creek and Indian River riverbed boundaries. To meet time constraints, target sites were ranked by priority from a scale of 1-6, indicating the level of detail required and order of site visits. See Table 1 for rationale, ranking, and the type of study performed on each parcel.

Investigators were on-site from September 22, 2025, to September 26, 2025. As the ground efforts progressed throughout the week, weather conditions worsened, resulting in landslide risks at several parcels. As a result, PND and CBS reevaluated site prioritization, and the remaining time was reallocated to collecting additional data at the Gavan Hill and SHS parcels to constitute a full USACE wetland delineation. Reconnaissance-level wetland investigation was performed on sites with potentially hazardous conditions: the Benchlands and Harbor Mountain Road. The Upper Edgecumbe Drive parcel was excluded from the field survey due to landslide risks and prioritization. Details regarding this are further explained in Section 2.2. Low priority sites along Green Lake Road south of Herring Cove were not investigated due to time access constraints.

The investigations at remaining parcels were not impacted by worsening weather and landslide risk; the study scope at each parcel is discussed in subsequent sections.

Table 1. Priority Area Ranking and Survey Type

Project Parcel Name	Survey Type	Priority	Notes
Gavan Hill	Wetland delineation	2	Previous development includes the Sitka Cross Trail with appurtenances as well as several offshoot foot and bike paths. High level of detail collected sufficient for wetland delineation. Map the creek and estimate non-buildable limits.
SHS	Wetland delineation	1	Several informal foot paths and a bonfire ring are present. High level of detail collected sufficient for wetland delineation.

Project Parcel Name	Survey Type	Priority	Notes
Upper Edgecumbe Drive	Initially, wetland reconnaissance; No physical survey due to weather conditions and landslide risks	6	Aerial imagery indicates minimal disturbance; the Sitka Cross Trail passes through the parcel. Medium level of detail. Not surveyed due to hazardous conditions.
The Benchlands	Wetland reconnaissance	4	Previous development includes roads, culs-de-sac, culverts, stormwater velocity reduction pond, and vegetation clearing for access. Previously platted. Confirm plat restrictions.
Harbor Mountain Road	Wetland reconnaissance	3	Previous development includes informal foot trails and Harbor Mountain Road. Litter and human-installed items, including a rope swing and traffic signs attached to vegetation, present. Medium detail.
Indian River	Reconnaissance, map the approximate limits of the riverbed.	5	Previous development includes a formal trail adjacent to the riverbank. Map the approximate limits of the riverbed. Potential for roadway, access-focused.
Herring Cove	Land-based eelgrass reconnaissance.	Low	Previous development includes an access road and trailhead parking lot. Land-based eelgrass reconnaissance.
Green Lake Road	Wetland Reconnaissance	Low	Previous development includes a controlled-access road. Not investigated due to time and access constraints.
Osprey Street	No review due to development	None. Not considered.	Site is developed and paved. PND did not review.

1.1 PROJECT LOCATION

The study area encompasses nine parcels within CBS to support decision-making. In this report, project parcels will be referred to by the following site names: Gavan Hill, Sitka High School (SHS), Upper Edgecumbe Drive, The Benchlands, Harbor Mountain Road, Indian Hill, Herring Cove, Green Lake Road, and Osprey Street.

Details on each site are listed below in Table 2. Following discussions with CBS, the Osprey Street site was not considered during the reconnaissance due to the high level of existing development and fill present on the parcel, reducing the likelihood of wetland presence. Herring Cove was reviewed for eel grass from the beach, and the approximate riverbed limits at the Indian River site were mapped to assess the potential for a roadway through the parcel. Low priority sites along Green Lake Road south of Herring Cove (i.e., the Green Lake Road site) were not investigated due to time and access constraints.

Table 2: Project Parcels

Project Parcel Name	CBS Parcel Number	Coordinates	USGS Hydraulic Unit Code (HUC)
Gavan Hill	3-0280-000, 1-8600-000, 1-8650-000	57.0656° N, -135.3350° W	190102121206
SHS	1-7931-000	57.0622° N, -135.3383° W	190102121206
Upper Edgecumbe Drive	N/A	57.0716° N, -135.3584° W	190102121206
The Benchlands	N/A	57.0842° N, -135.3725° W	190102121206
Harbor Mountain Road	2-4940-000	57.0955° N, -135.3858° W	190102121206
Indian River	1-8580-000, 3-0260-000, 3-0270-000	57.0621° N, -135.3029° W	190102121106
Herring Cove	N/A	57.1446° N, -135.2024° W	190102121104
Green Lake Road	N/A	57.0275° N, -135.1797° W	190102121104

Project Parcel Name	CBS Parcel Number	Coordinates	USGS Hydraulic Unit Code (HUC)
Osprey Street	1-5410-000	57.0558° N, -135.3447° W	190102121206

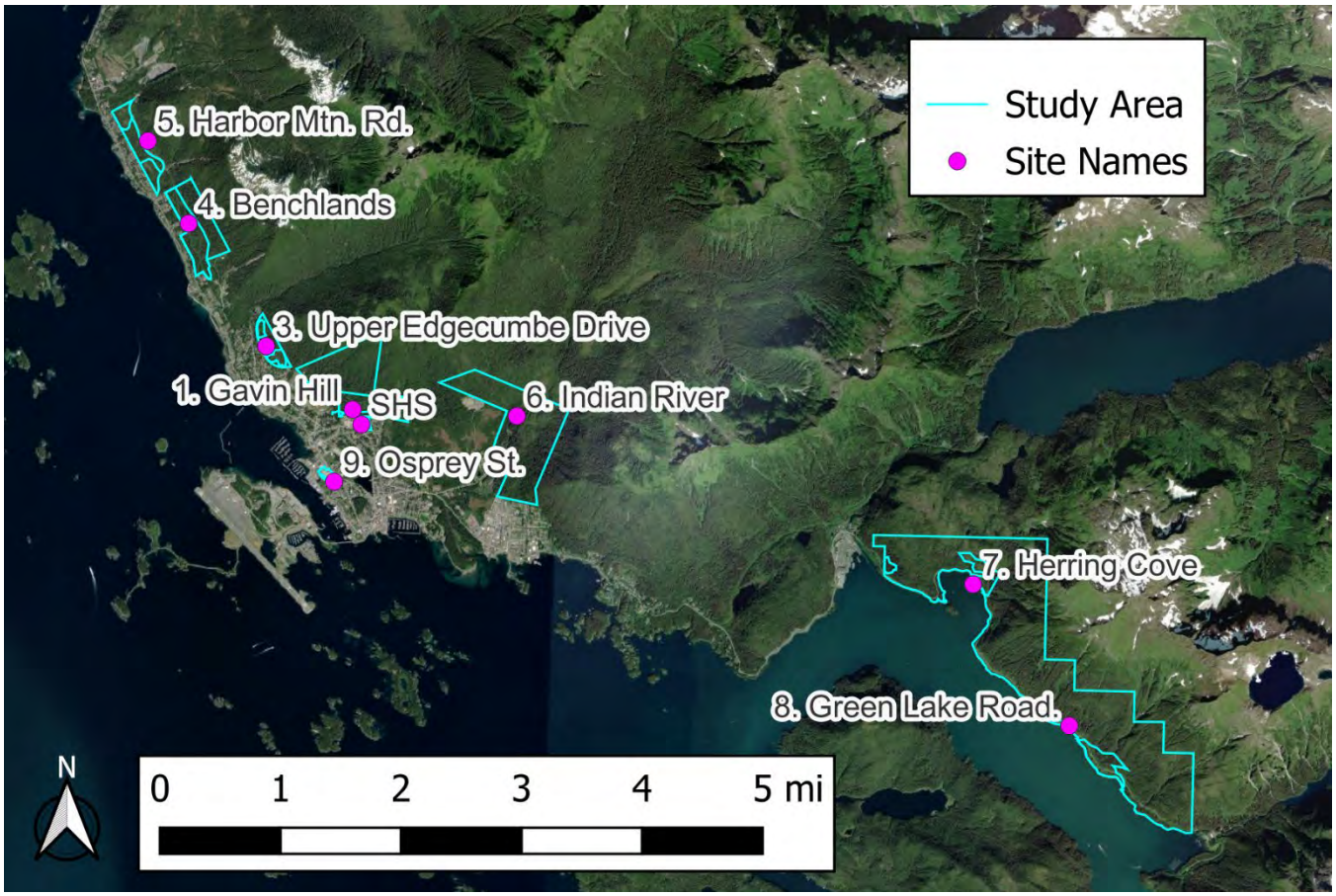

Figure 1: Location of Project Parcels within the City & Borough of Sitka

2.0 METHODS

2.1 BACKGROUND INFORMATION REVIEW

Prior to conducting the field investigation, PND reviewed existing data sources for information related to wetlands in the project area and vicinity. Data reviewed for the delineation and reconnaissance included aerial imagery (Google Earth 2025), the National Wetland Inventory (NWI) maps and database (USFWS 2025), and Natural Resources Conservation Service (NRCS) soil survey data (USDA 2025).

Rainfall data for the project area was accessed via AgACIS, a data service from the National Oceanographic and Atmospheric Administration (NOAA) Regional Climate Centers. The Sitka 1 NE (FIPS

02220, 57.057607°N, -135.326597°W) station was selected as the closest station with complete precipitation data.

2.2 RECONNAISSANCE

PND environmental scientists Jessica Ngo and Schuyler Roskam conducted a wetland reconnaissance study from September 22 to September 25, 2025. Weather conditions consisted of heavy rain and winds that occurred in intervals throughout the week, and cloudy skies. Preliminary wetland boundaries were estimated using the three-parameter approach in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Ver. 2) (USACE 2007), referred to hereafter as the Regional Supplement.

On September 22nd, Kim Davis from CBS joined investigators and led a tour for parcel access options in the study areas. After the tour, investigators walked through the sites in order of priority to view the project area layout and to catalog vegetation communities. Subsequently, detailed site information regarding hydrophytic vegetation, hydric soils, and wetland hydrology was recorded throughout the entire study area following the initial walkthrough. Sample point locations were selected based on vegetation communities, with adjacent points added as necessary to confirm wetland and upland characteristics. Investigators focused reconnaissance efforts on areas identified as developable on each parcel of interest.

By September 25th, investigators had completed wetland reconnaissance on Gavan Hill, SHS, Harbor Mountain Road, and the Benchlands. They also mapped the Indian River riverbed boundary, covering priority areas 1-5. As weather conditions worsened, PND and CBS determined that Harbor Mountain Road, the Benchlands, and Upper Edgecumbe Drive posed landslide risks. Data was previously collected at Harbor Mountain Road and the Benchlands earlier in the week; however, due to the lower priority ranking on Upper Edgecumbe Drive, investigators were not able to reach the site before conditions became unsafe. As such, no field data was collected for Upper Edgecumbe Drive.

Findings were recorded on Alaska Region Wetland Determination Data Forms (Version 2.0) (referred to hereafter as Data Forms). Data recorded included site location, description, and wetland determination. Photos were taken of the general site conditions, as well as soil samples and pits. Data points were recorded using Solocator – GPS Field Camera, a mobile phone app. The Data Forms are included in Appendix B.

2.3 DELINEATION

Following coordination with CBS on hazardous conditions on September 25th, investigators focused the remaining time on collecting additional data on the Gavan Hill and SHS sites, sufficient to complete a wetland delineation-level investigation. Findings and data points were recorded in the same manner as described in Section 2.2. Additional detail and sample points were collected in order to better understand the wetland/upland boundaries on these two parcels.

2.3.1 VEGETATION

Vegetation present in the sample areas was identified and noted on the Data Forms. Percent of absolute cover for each species by stratum (tree, sapling/shrub, or herb) was estimated per the Regional Supplement.

Plot sizes were generally circles with 20-foot radii. Plot areas were contained within the survey area limits.

Dominance of each species was evaluated according to the protocol in the Regional Supplement. Wetland indicator status for each species was determined using the Alaska 2022 Regional Wetland Plant List (USACE 2023). The indicator status categories are obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), upland (UPL), or no indicator (NI). Plant species nomenclature is based on the Flora of Alaska (Ickert-Bond et al. 2019). Determination of hydrophytic vegetation was made using the Dominance Test and the Prevalence Index.

2.3.2 SOILS

Soils were sampled by hand excavation to at least 16 inches in depth. Depth, color (by Munsell Color Chart, 2022), and texture of soil horizons were recorded on the Data Forms. Hydric soil indicators were evaluated based on the descriptions in the Regional Supplement. Determination of hydric soil was made based on the presence of one or more hydric soil indicators.

A soil auger was used to supplement digging in difficult soils. Auger holes were also used throughout the survey to confirm extents of hydric soil properties.

2.3.3 HYDROLOGY

Hydrology was evaluated based on the descriptions of indicator features contained in the Regional Supplement. The presence or absence of surface water, as well as the depth to water table or soil saturation (where present) was recorded for each site. Additional primary or secondary indicators were noted where found. Determination of wetland hydrology was based on the presence of at least one primary indicator or two or more secondary indicators.

2.4 WETLAND CLASSIFICATION

Wetlands found within the project area were classified based on the U.S. Fish and Wildlife Service (USFWS) classification system as described by Cowardin et al. (1979). This system is based on an evaluation of attributes such as vegetation class and hydrologic regime.

2.5 WETLAND MAPPING

Global positioning system (GPS) data points were taken using a mobile phone app with approximately three-meter accuracy. Data point positional accuracy was dependent on several factors, including overstory density. Metadata for each point includes an estimate of accuracy. Geographical Information System (GIS) software was used to map the approximate boundaries of wetlands by referencing aerial photography, GPS data, and georeferenced photographs collected in the field.

The level of detail and accuracy of wetland boundaries is relative to the site prioritization described above, with high priority sites receiving a treatment comparable to a full wetland delineation and medium or lower priority sites relying increasingly on aerial imagery and field notes to estimate wetland edges.

2.6 OTHER WATERS OF THE U.S.

In addition to wetlands, investigators also surveyed the Gavan Hill parcel to map Peterson Creek and its tributaries, and the Indian River parcel to map the approximate riverbed boundary for Indian River. This information was collected to help inform decisions for potential development.

GPS data points using Solocator and another mobile phone application, All Trails, were taken along the centerline of Peterson Creek and its tributaries, when accessible, at the Gavan Hill site. For areas that were inaccessible due to being blocked by woody debris or were too deep to traverse, data points were collected along the stream bank. GPS points to approximate the upper edge of the right bank of the Indian River were also recorded using Solocator and All Trails. GIS software was used to estimate stream centerline and the right bank of the Indian River by visually approximating the average of GPS points collected with Solocator and All Trails. Georeferenced photos and aerial imagery were also used to supplement positional data when mapping these features.

The Herring Cove site was reviewed in a land-based survey for eel grass from Herring Cove Beach.

3.0 RESULTS

3.1 BACKGROUND INFORMATION REVIEW

The NWI indicated that freshwater forested/shrub wetlands, riverine wetlands, freshwater emergent wetlands, and estuarine and marine wetlands are present within the various parcels. Refer to Table 3.

Table 3. NWI Wetland Mapping by Parcel

Parcel	Wetlands Present?	Type of Wetlands (with NWI Cowardin Classification Code)	Field Findings
Gavan Hill	Yes	Riverine (R5UBH), Freshwater Forested/Shrub Wetland (PFO4B, PSS1/EM1B, PSS1/FO4B), Freshwater Emergent Wetland (PEM1/SS1B)	Not consistent.
SHS	Yes	Freshwater Forested / Shrub Wetland (PFO4B and PSS1/FO4B)	Not consistent.
Upper Edgecumbe Drive	Yes	Freshwater Forested/ Shrub Wetland (PFO4B)	No data collected.

Parcel	Wetlands Present?	Type of Wetlands (with NWI Cowardin Classification Code)	Field Findings
The Benchlands	Yes	Freshwater Forested/ Shrub Wetland (PFO4B)	Not consistent.
Harbor Mountain Road	Yes	Freshwater Forested/ Shrub Wetland (PFO4B and PSS1/EM1C)	Largely consistent.
Indian River	Yes	Freshwater Forested/ Shrub Wetland (PFO4B, PSS1/EM1B), Riverine (R3UBH, R3USA, R5UBH), Freshwater Emergent Wetland (PEM1F)	Not reviewed for wetlands.
Green Lake Road	Yes	Freshwater Forested/ Shrub Wetland (PFO4B, PSS4/1B, PSS4/EM1B, PSS1B, PFO4B/SS4B), Freshwater Pond (PUBH), Estuarine and Marine Wetland (E2USN), Riverine (R5UBH, R4SBA), Estuarine and Marine Deepwater (E1UBL)	Not reviewed for wetlands.
Herring Cove	No	-	Not reviewed for wetlands.
Osprey Street	No	-	No field visit occurred.

The NWI maps were inconsistent with the wetlands found on Gavan Hill, SHS, and the Benchlands. NWI wetlands on the Gavan Hill and SHS parcels were found to cover a larger area of parcels than field-observed wetlands. Alternatively, NWI wetlands on the Benchlands were found to cover a smaller area than wetlands observed in the field. On the Harbor Mountain Road parcel, NWI mapping was largely consistent with field findings. NWI wetlands and field-observed wetlands were similar in size; however, the wetland coverage on NWI was slightly larger.

USFWS NWI mapping uses a single-parameter methodology and is often solely based on aerial imagery, often overestimating wetland areas. Inconsistencies between field findings and NWI mapping are likely attributed to this.

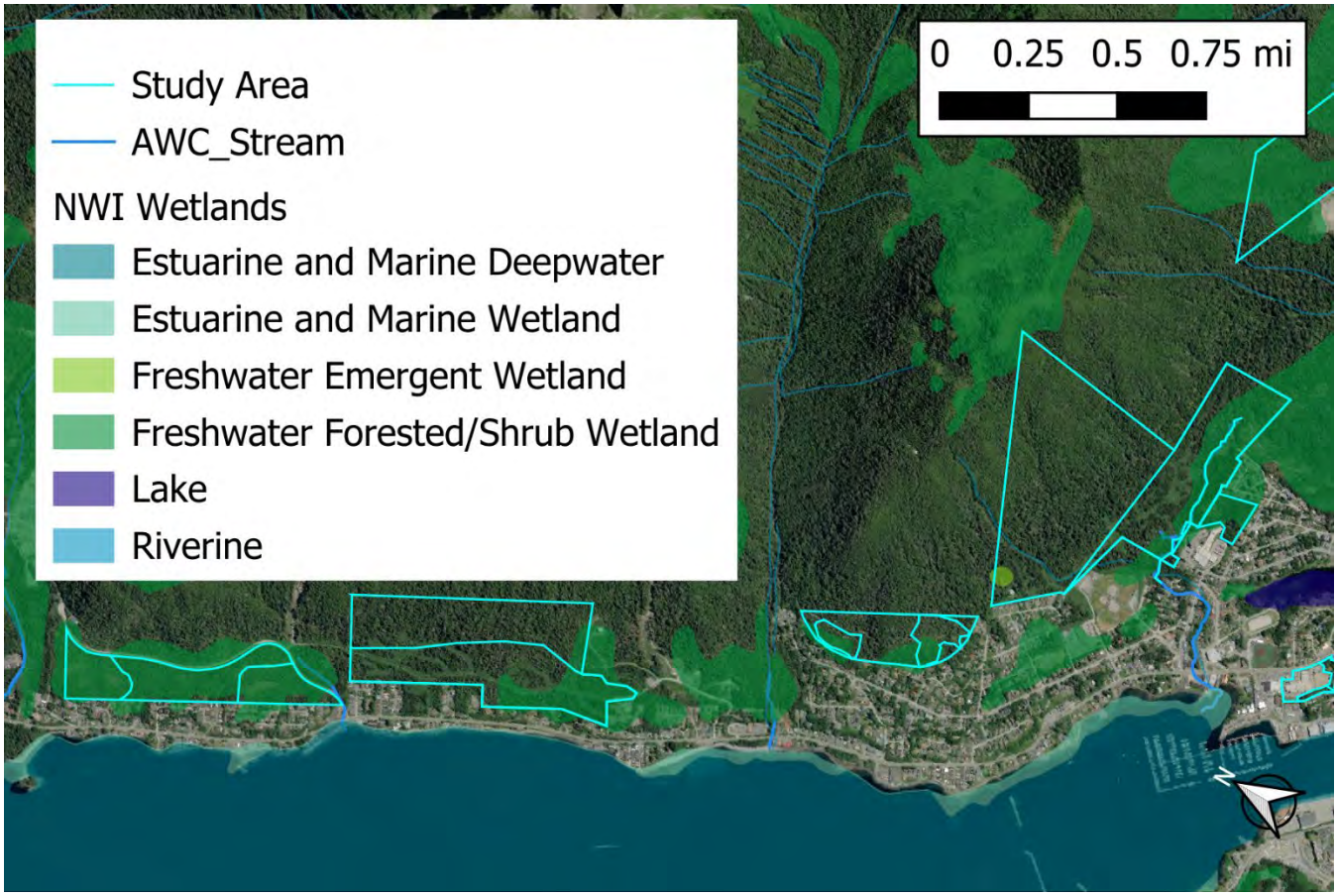

Figure 2. Parcels Targeted for Wetland Reconnaissance With NWI-Mapped Wetlands

Rainfall data for the project area was accessed via AgACIS as described in Section 2.1. At the nearby Sitka NE 1 station, precipitation in September 2025 was above the 2006-2025 average (Figure 3). Heavy rainfall occurred intermittently throughout the survey period.

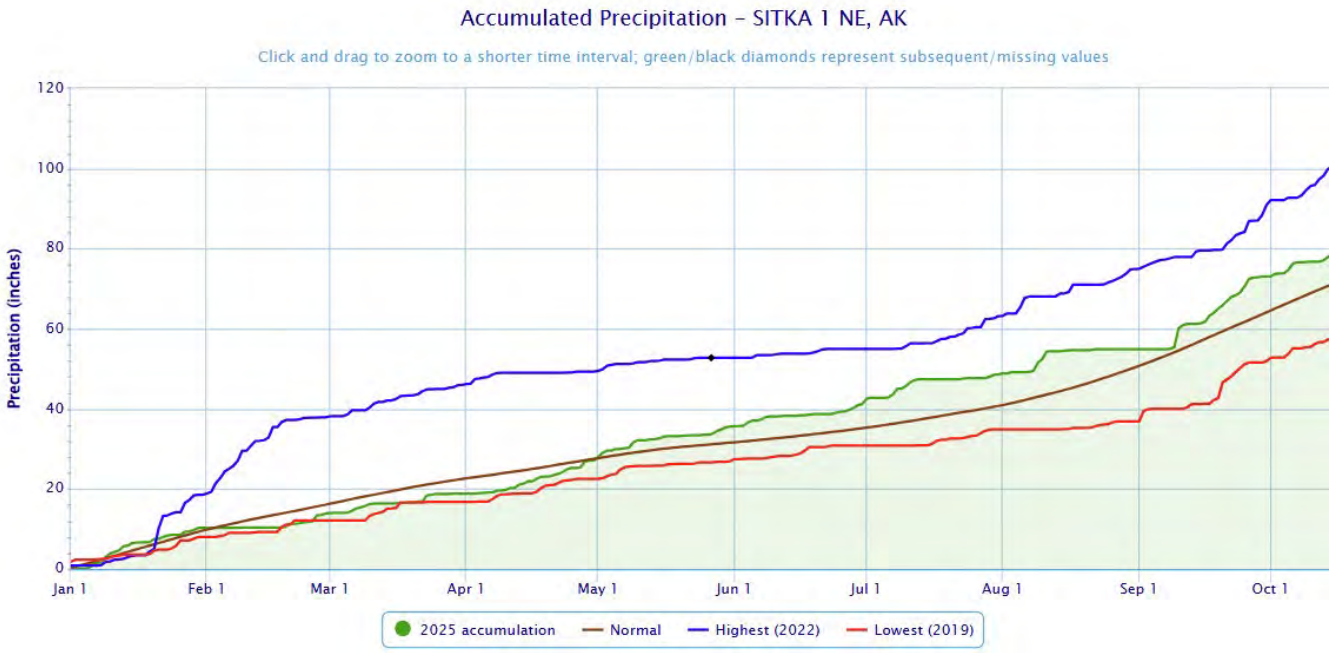

Figure 3: Precipitation Accumulation for Sitka 1 NE Station (NOAA Regional Climate Centers 2025)

3.2 APPROXIMATE STREAM MAP & RIVERBED BOUNDARIES

The survey located approximate creek locations throughout the Gavan Hill parcel. Peterson Creek is a perennial stream that runs through the Gavan Hill parcel and generally has a width of 10 to 25 feet from bank to bank. The creek begins at the eastern end of the parcel, and meanders southwest before eventually draining to Sitka Sound (Figure 4,Figure 7). Peterson Creek is listed in the Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes (AWC) and is reported to support coho salmon, pink salmon, and Dolly Varden (AWC 2025). The approximate location of the creek was verified in the field to be consistent with the Alaska Department of Fish & Game's (ADF&G) Anadromous Waters Catalog mapping. Tributaries to Peterson Creek were also mapped where encountered up to where they emerged from the ground or where they passed under the Sitka Cross Trail.

Figure 4: Peterson Creek

Investigators also located an approximate riverbed boundary along the right bank of the Indian River to support assessing development potential (Figure 5). Indian River is also listed on the Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fish.

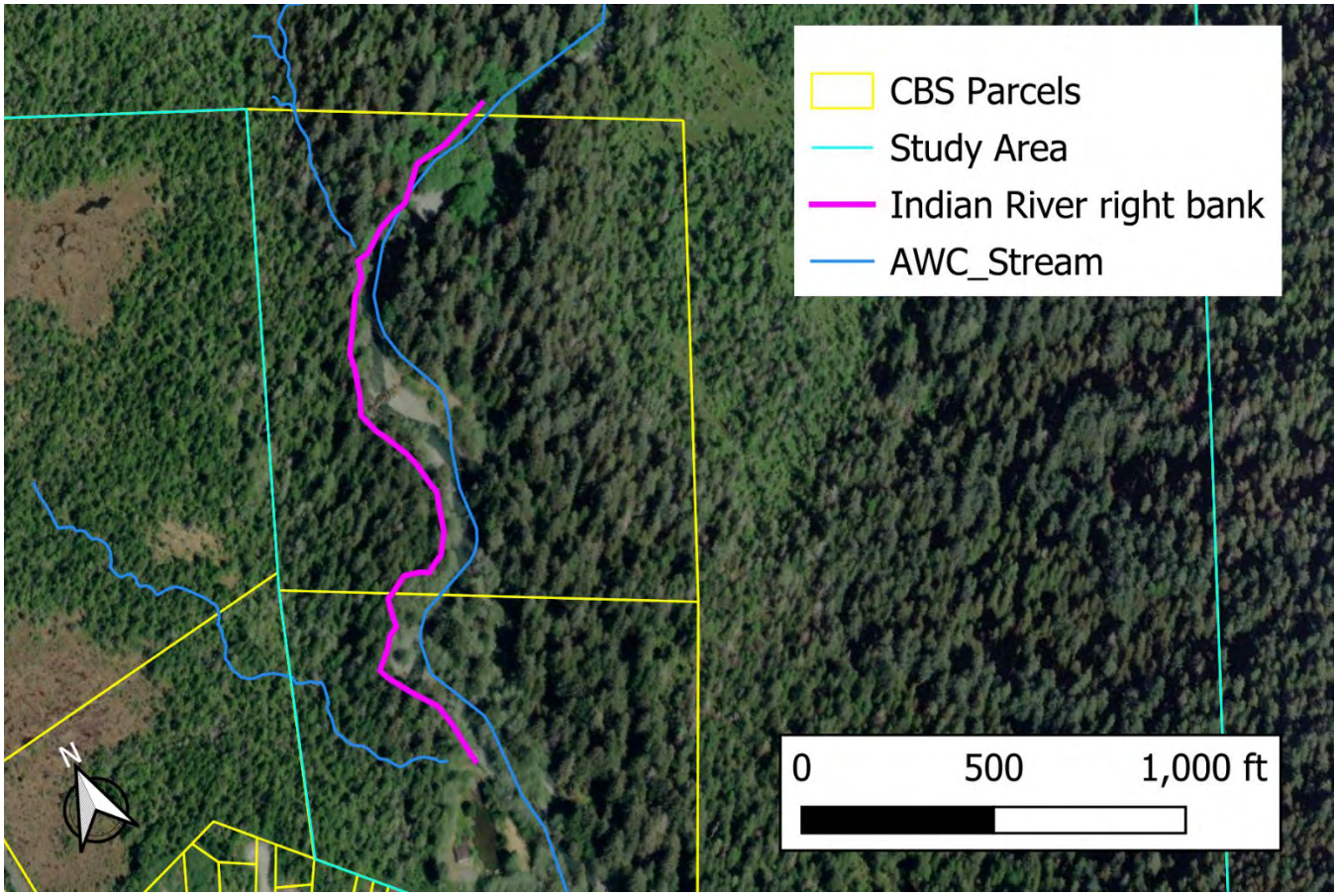

Figure 5. Mapped Upper Edge of the Right Bank of Indian River

Figure 6: Indian River

3.3 HERRING COVE EEL GRASS OBSERVATIONS

Observations for eel grass were conducted from the beach in Herring Cove at low tide (3.36 ft) at 9:30 am on September 26, 2025. The weather consisted of cloudy skies with light showers. The tide level did not allow for observation of eelgrass in the dry, and the lighting and weather conditions obscured habitat below the water surface. PND investigators did not observe eel grass from the shoreline. Spawning and pre-spawning salmon were observed at the mouth of AWC 113-41-10240 and along the gravelly shoreline of Herring Cove. Recommendations are discussed in Section 5.0.

Table 4. Herring Cove Trailhead Plant List

Scientific Name	Wetland Rating	Common Name
Alnus rubra	FAC	Red Alder
Calamagrostis canadensis	FAC	Bluejoint
Picea sitchensis	FACU	Sitka Spruce
Plantago major	FAC	Great Plantain
Poa pratensis	FACU	Kentucky Blue Grass
Ranunculus repens	FAC	Creeping Buttercup
Rubus spectabilis	FACU	Salmon Raspberry

Table 5. Herring Cove Beach Plant List

Scientific Name	Wetland Rating	Common Name
Deschampsia caespitosa	FAC	Tufted Hair Grass
Geum macrophyllum	FAC	Large-Leaf Avens
Leymus mollis	FAC	American Lyme Grass
Phleum pratense	FACU	Common Timothy
Plantago maritima	FACW	Goosetongue
Sanguisorba canadensis	FACW	Canadian Burnet
Taraxacum officinale	FACU	Common Dandelion
Trifolium hybridum	FAC	Alsike Clover

The presence of wetland plants below the high tide line of Herring Cove suggests that a portion of the shoreline may be marine or estuarine wetlands, which should be considered prior to future development.

3.4 WETLAND DELINEATION

As discussed in the previous sections, site prioritization was reconsidered due to worsening weather conditions and potential landslide hazards. Additional data was collected at the Gavan Hill and SHS

parcels to suffice complete wetland delineations. The findings are detailed in the subsequent sections below.

Boundaries between the wetland and upland areas were mapped based on differences in vegetative communities, with the use of a soil auger, micro-topography, and hydrology observations for confirmation. Upland areas throughout the study area generally included a greater number and higher coverage of FACU species, which differentiated them from the observed wetland vegetative communities.

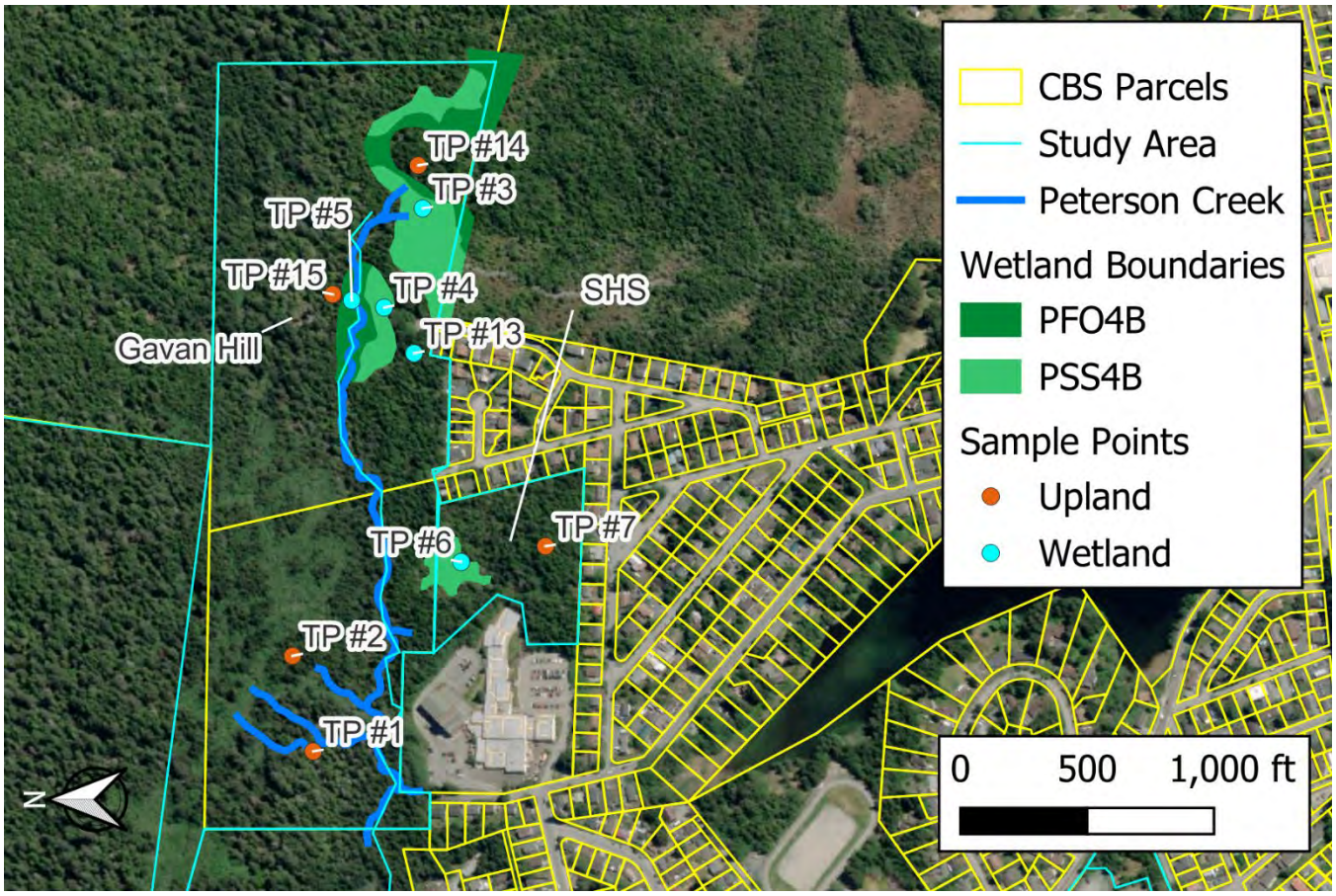

Figure 7. Gavan Hill and SHS Delineated Wetland Boundaries, Sample Points, and Streams

3.4.1 VEGETATION OBSERVED AT GAVAN HILL AND SHS

Trees within the Gavan Hill and SHS parcels generally consisted of Sitka spruce (*Picea sitchensis*; FACU), western hemlock (*Tsuga heterophylla*; FAC), Alaska-cedar (*Callitropsis nootkatensis*; FAC), western red cedar (*Thuja plicata*; FAC), and lodgepole pine (*Pinus contorta*; FAC).

Shrub species included rusty Labrador-tea (*Rhododendron groenlandicum*; FAC), salmonberry (*Rubus spectabilis*; FACU), fool's-huckleberry (*Menziesia ferruginea*; FACU), black crowberry (*Empetrum nigrum*; FAC), oval-leaf blueberry (*Vaccinium ovalifolium*; FAC), Canadian bunchberry (*Cornus canadensis*; FACU), red huckleberry (*Vaccinium parvifolium*; FACU), and lingonberry (*Vaccinium vitis-idaea*; FAC).

Tree species that did not meet the size requirements for the tree stratum, such as Sitka spruce (*Picea sitchensis*; FACU) and western hemlock (*Tsuga heterophylla*; FAC), were also included in the shrub stratum.

The herb stratum was well developed and consisted primarily of ferns and sedges typical of moist coastal forests. Common species included deer fern (*Blechnum spicant*; FAC), western lady fern (*Athyrium cyclosorum*; FAC), two-leaf false Solomon's-seal (*Maianthemum dilatatum*; FAC), fern-leaf goldthread (*Coptis aspleniifolia*; FAC), and three-leaf foamflower (*Tiarella trifoliata*; FAC). Mertens' sedge (*Carex mertensii*; FACW), several-flower sedge (*Carex pluriflora*; OBL), and bluejoint (*Calamagrostis canadensis*; FAC) were found in wetland areas. Yellow-skunk-cabbage (*Lysichiton americanus*; OBL) and Canadian burnet (*Sanguisorba canadensis*; FACW) were also present in wetland areas.

A majority of the vegetation observed had a FAC rating. Upland sites were dominated by Sitka spruce (*Picea sitchensis*) in the tree layer, fool's-huckleberry (*Menziesia ferruginea*), Canadian bunchberry (*Cornus canadensis*), salmonberry (*Rubus spectabilis*), and red huckleberry (*Vaccinium parvifolium*) in the shrub layer, and spreading wood fern (*Dryopteris expansa*) and American twinflower (*Linnaea borealis*) in the herb layer. Wetland sites included *Carex* spp. and stunted trees. Despite the obligate rating, skunk cabbage (*Lysichiton americanus*) was a poor indicator of wetland presence and was often found growing in micro-depressions filled with ponded water throughout upland and wetland sites.

The prevalence of FAC species in the project area means that a given site will typically pass tests for hydrophytic vegetation unless FACU species clearly dominate in more than one stratum. In the case of this survey, dense understories of fool's huckleberry, red huckleberry, and/or salmonberry provided a good indication that vegetation would not be considered hydrophytic. Stands dominated by Sitka spruce in the tree stratum were strongly indicative of non-hydrophytic vegetation.

Table 6 lists all vegetative species observed at the Gavan Hill and SHS sample plots during the site visit.

Table 6. Vegetative Species Observed at Gavan Hill and SHS Parcels

Scientific Name	Wetland Ranking	Common Name
Athyrium americanum	FAC	American Alpine Lady Fern
Athyrium cyclosorum	FAC	Western Lady Fern
Blechnum spicant	FAC	Deer Fern
Calamagrostis canadensis	FAC	Bluejoint
Callitropsis nootkatensis	FAC	Alaska-Cedar
Carex mertensii	FACW	Mertens' Sedge
Carex pluriflora	OBL	Several-Flower Sedge
Coptis aspleniifolia	FAC	Fern-Leaf Goldthread

Scientific Name	Wetland Ranking	Common Name
Cornus canadensis	FACU	Canadian Bunchberry
Dryopteris expansa	FACU	Spreading Wood Fern
Empetrum nigrum	FAC	Black Crowberry
Linnaea borealis	FACU	American Twinflower
Lysichiton americanus	OBL	Yellow-Skunk-Cabbage
Maianthemum dilatatum	FAC	Two-Leaf False Solomon's-Seal
Menziesia ferruginea	FACU	Fool's-Huckleberry
Picea sitchensis	FACU	Sitka Spruce
Pinus contorta	FAC	Lodgepole Pine
Rhododendron groenlandicum	FAC	Rusty Labrador-Tea
Rubus pedatus	FAC	Strawberry-Leaf Raspberry
Rubus spectabilis	FACU	Salmonberry
Sanguisorba canadensis	FACW	Canadian Burnet
Thuja plicata	FAC	Western Red Cedar
Tiarella trifoliata	FAC	Three-Leaf Foamflower
Tsuga heterophylla	FAC	Western Hemlock
Vaccinium ovalifolium	FAC	Oval-Leaf Blueberry
Vaccinium parvifolium	FACU	Red Huckleberry
Vaccinium uliginosum	FAC	Alpine Blueberry
Vaccinium vitis-idaea	FAC	Northern Mountain-Cranberry

3.4.2 SOILS

Several test pits (TPs) were sampled to analyze soil properties and conditions. TPs were identified to either be UPL or wetland (W), refer to Appendix A for TP photos.

3.4.2.1 Gavan Hill

Soils at UPL-TP1 were identified as a histosol (A1 indicator) with a peaty muck soil texture, underlain by a gravelly sand material. Histosols are hydric soils with organic material of 16 inches or more from the soil surface. Despite the hydric soils, wetland vegetation was not found at UPL-TP1. An adjacent upland

plot, UPL-TP2, was found to have no hydric soils with a one-inch layer of peaty muck, and mineral soils with rocky silty sand and sandy loam textures.

Test pits 3-5 (W-TP3, W-TP4, and W-TP5) were all identified to have hydric soils; each test pit met the A1 histosol indicator. W-TP3 and W-TP4 were found to have 16 inches of peat, while W-TP5 had three inches of mucky peat, followed by +13 inches of muck. UPL-TP13 was also found to have hydric soils with 16 inches of mucky peat soils, but had failed the vegetation parameter. UPL-TP14 met parameters to be considered a histic epipedon, with an 8-inch peat layer overlying two inches of mineral soil with chroma of 2 or less, but the plot failed tests for hydrophytic vegetation.

Soils at UPL-TP15 did not meet hydric soil indicators. UPL-TP15 had two inches of duff followed by 14 inches of sandy loam mineral soils. Investigators did not dig past 16 inches due to the vegetation parameter failing.

3.4.2.2 SHS

The SHS parcel displayed similar vegetation communities and site characteristics to the Gavan Hill parcel. Investigators took two sample plots on the parcel to confirm site characteristics and estimate preliminary wetland boundaries. W-TP6 met hydric soil indicator A1 and was found to be a histosol with 16 inches of mucky peat. UPL-TP7 did not meet any hydric soil indicators and was underlain by four layers of mineral soils, including sandy loam, loamy sand, and two more layers of sandy loam.

3.4.3 HYDROLOGY OBSERVED AT GAVAN HILL AND SHS PARCELS

The wetland areas generally featured at least one of the following primary hydrology indicators: ponded surface water, high water table (1-16 inches), saturation (from 0 to 2 inches), and hydrogen sulfide odor.

Prolonged heavy rains likely influenced hydrology indicators; however, that weather is typical during September in Sitka.

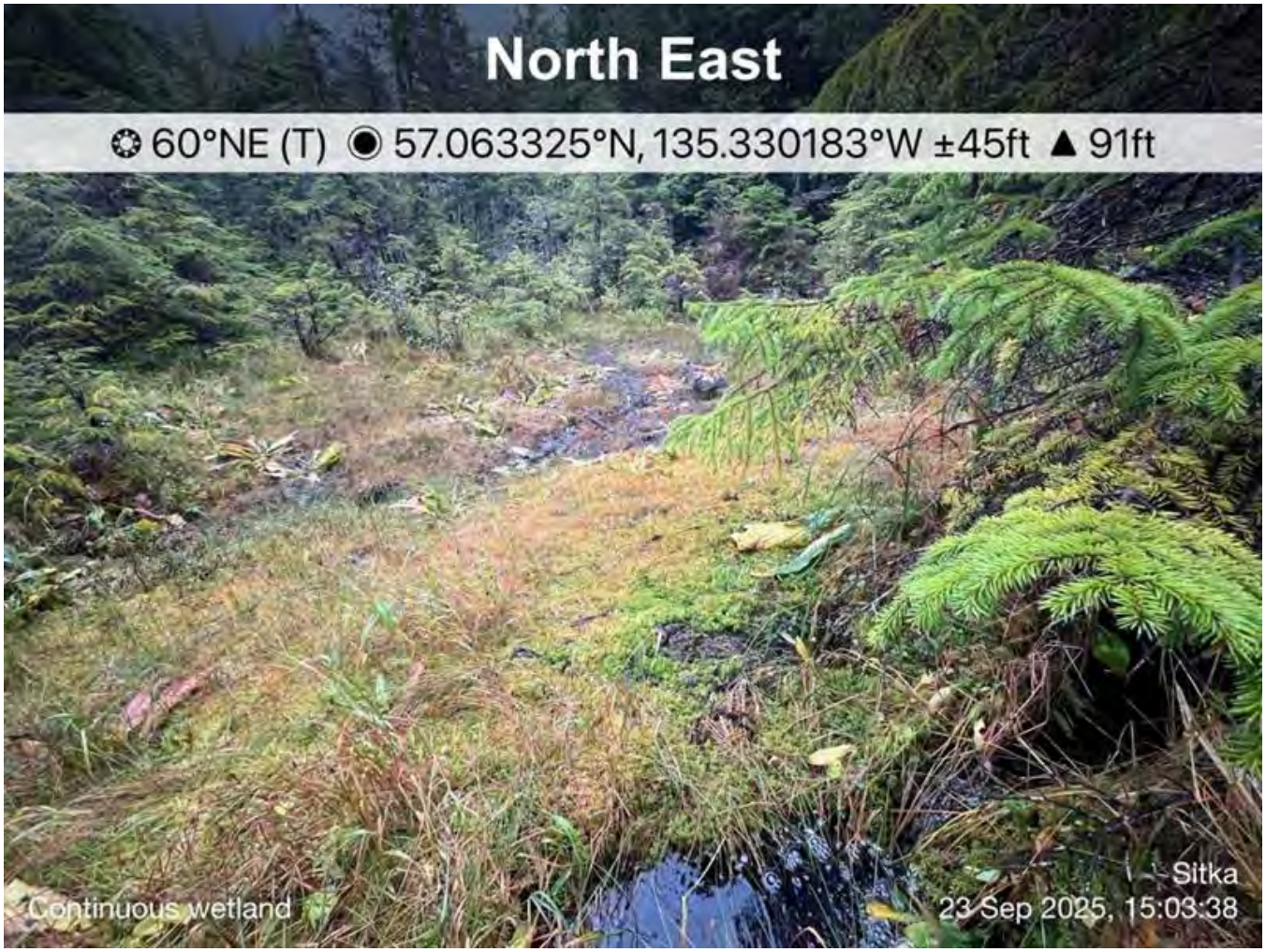

Figure 8: Surface Water Visible at a Wetland Site

3.4.4 WETLAND CLASSIFICATION

Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, or emergent vegetation. In forested wetlands, trees are the dominant life form with a minimum of 30% areal coverage. "Needle-leaved evergreen" is a subclass of forested wetlands, which represents species like Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), Alaska cedar (*Callitropsis nootkatensis*), western red cedar (*Thuja plicata*), and lodgepole pine (*Pinus contorta*) (Cowardin et al. 1979). In scrub-shrub wetlands, woody plants less than 20 feet tall are the dominant life form.

Table 7. Wetland Classifications for Gavan Hill and SHS Parcels (Field Findings)

Parcel	Wetlands Present?	Field Findings & Classification	Cowardin Classification Code	Area (acres)
Gavan Hill	Yes	Palustrine Forested Wetland, Needle-Leaved Evergreen	PFO4B	3.41

Parcel	Wetlands Present?	Field Findings & Classification	Cowardin Classification Code	Area (acres)
		Palustrine Scrub-Shrub Wetland, Needle-Leaved Evergreen	PSS4B	3.37
SHS	Yes	Palustrine Scrub Shrub Wetland, Needle-Leaved Evergreen	PSS4B	0.83
Total				**7.61**

3.5 WETLAND RECONNAISSANCE

As described in Section 2.3, the Benchlands, Harbor Mountain Road, and Upper Edgecumbe Drive were not considered for a full delineation due to prolonged heavy rain, winds, and the resulting landslide risks. Due to the assigned priority ranking, the Benchlands and Harbor Mountain Road were surveyed earlier in the week, while the Upper Edgecumbe Drive site was planned to be surveyed at the end of the week. The Benchland and Harbor Mountain Road sites were evaluated in a reconnaissance effort to estimate wetland boundaries. As weather conditions worsened throughout the week and resulted in landslide risks, investigators were unable to access the Upper Edgecumbe Drive site to collect sample points for a wetland reconnaissance. Findings are summarized in the subsequent sections below.

Similar to the delineated parcels, the approximate boundaries between wetland and upland areas were estimated based on differences in vegetative communities, with the use of a soil auger, micro-topography, and hydrology observations for confirmation. Upland areas throughout the study area generally included a greater number and higher coverage of FACU species, which differentiated them from the observed wetland vegetative communities.

Wetland mapping at Harbor Mountain Road relied heavily on inferences made in the field and desktop information to supplement field samples, refer to Figure 9. Both sample plots and rapid sampling using a soil auger and visual estimations of vegetation cover were used as aids in mapping, but field efforts were limited due to time and budget constraints. It should be noted that the wetland/upland boundary at Harbor Mountain Road is highly ambiguous because of similarities in vegetation throughout the area and micro-topographical features with variable hydrology. Further study is needed at this parcel to accurately determine wetland boundaries.

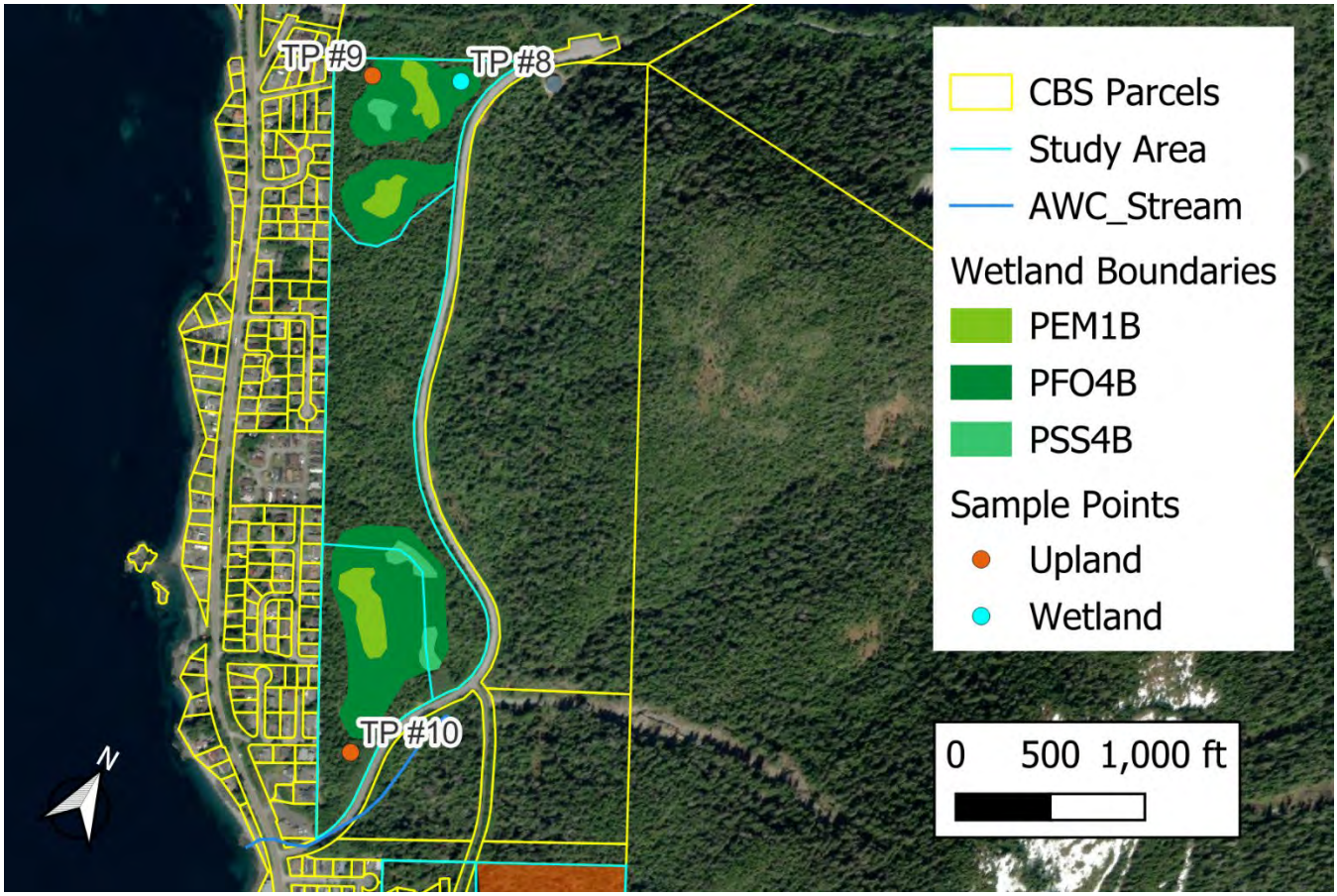

Figure 9. Sample Points and Approximate Wetland Boundaries at Harbor Mountain Road

Vegetation upslope from the platted lots and roads at the Benchlands subdivision was visually observed from the roads to be consistent with forested wetlands at Harbor Mountain Road (i.e., tree stratum dominated by Alaska cedar, relatively open canopy). A sample plot with vegetation representative of what was observed remotely in that area was confirmed to meet criteria for hydrophytic vegetation (W-TP12). This area is presumed to have a high likelihood of wetland presence (Figure 10). Further investigation at the Benchlands was halted during the survey due to heavy rains and landslide risk. Investigators hold the opinion that the subdivision was designed, in part, to avoid wetlands.

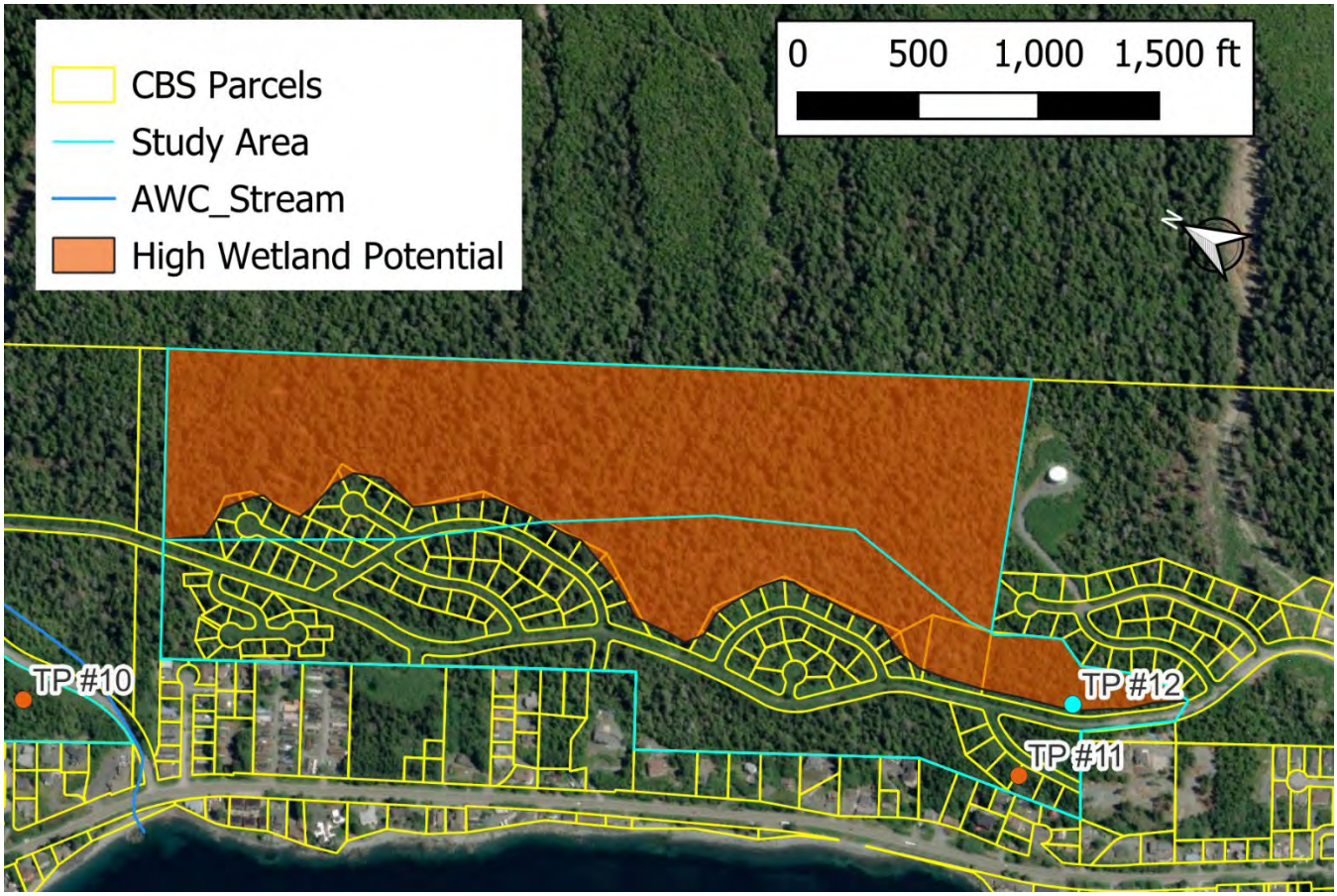

Figure 10. Area of High Wetland Potential at the Benchlands Subdivision.

Aerial imagery of the Upper Edgecumbe Drive site shows a heavily forested area with no clear indication of stunted or dying vegetation that was indicative of wetlands on the other parcels. Furthermore, available aerial imagery lacks resolution for plant identification to distinguish upland species. Micro-topography may offer some wetland indication, but is likely not sufficient in determining preliminary boundaries for this site. Refer to Section 5.0 for anticipated future efforts.

3.5.1 VEGETATION OBSERVED AT THE BENCHLANDS AND HARBOR MOUNTAIN ROAD

Trees in the reconnaissance areas were generally the same as at the delineated Gavan Hill sites, with the addition of red alder (*Alnus rubra;* FAC*)*.

Shrub species were generally consistent with the communities observed during the delineation effort; however, the sample plots at the reconnaissance parcels lacked rusty Labrador-tea (*Rhododendron groenlandicum*; FAC) and black crowberry (*Empetrum nigrum*; FAC). Tree species that did not meet the size requirements for the tree stratum were also included in the shrub stratum.

The herb stratum vegetation communities were consistent with species observed at the delineated wetlands, with a few exceptions. Western lady fern (*Athyrium cyclosorum*; FAC), three-leaf foamflower

(*Tiarella trifoliata*; FAC), and bluejoint (*Calamagrostis canadensis*; FAC) were not present at the reconnaissance sampling plots.

A majority of the vegetation observed had a FAC rating. Upland sites also were dominated by Sitka spruce (*Picea sitchensis*) in the tree layer, fool's-huckleberry (*Menziesia ferruginea*), Canadian bunchberry (*Cornus canadensis*), salmonberry (*Rubus spectabilis*), and red huckleberry (*Vaccinium parvifolium*) in the shrub layer, and American twinflower (*Linnaea borealis*) in the herb layer. Similar to the delineated sites, *Carex* spp. typically dominated the herb layer at wetland sites while skunk cabbage (*Lysichiton americanus*) was a poor indicator for wetland presence.

The prevalence of FAC species in the project area means that a given site will typically pass tests for hydrophytic vegetation unless FACU species clearly dominate in more than one stratum. In the case of this survey, dense understories of fool's huckleberry, red huckleberry, and/or salmonberry provided a good indication that vegetation would not be considered hydrophytic. Stands dominated by Sitka spruce in the tree stratum were strongly indicative of non-hydrophytic vegetation.

3.5.2 SOILS

Test pits (TPs) were sampled at the delineation sites to analyze soil properties and conditions. TPs were identified to either be UPL or wetland (W), refer to Appendix A for TP photos.

3.5.2.1 Soils at The Benchlands

Two sample plots were taken at the Benchlands to confirm site characteristics for wetlands and uplands. UPL-TP11 failed to meet hydric soil indicator A2 and lacked saturation and a high-water table. This soil comprises 10 inches of peat, followed by two layers of sandy loam mineral soils. W-TP12 met both A1 and A4 (hydrogen sulfide) hydric soils indicators. This soil had two inches of duff on the top layer, followed by 14 inches of peaty muck.

3.5.2.2 Soils at Harbor Mountain Road

Three sample points were taken at the Harbor Mountain Road parcel to confirm wetland and upland characteristics. W-TP8 soils were classified as a histosol (A1) with 18 inches of peaty muck. UPL-TP 9 was sampled using a soil auger. Soils in UPL-TP9 comprised two layers of loam and sandy loam mineral soils that failed to meet hydric soil indicators. Investigators dug to over 20 inches and noted that the soils appeared to be compressed from foot traffic. A second upland sample plot was done, UPL-TP10, where eight inches of peat and 8 inches of sandy loam were identified. No saturation or high water table was present, and the soils failed the A2 indicator.

3.5.3 HYDROLOGY OBSERVED AT THE BENCHLANDS AND HARBOR MOUNTAIN ROAD

Similar to the Gavan Hill sites, wetland areas examined during the reconnaissance generally featured at least one of the following primary hydrology indicators: ponded surface water, high water table (1-16 inches), saturation (from 0-2 inches), and hydrogen sulfide odor.

Prolonged heavy rains likely influenced hydrology indicators; however, that weather is typical during September in Sitka.

3.5.4 WETLAND CLASSIFICATION

Investigators observed wetlands with similar conditions to those found at Gavan Hill during the reconnaissance portion. Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, or emergent vegetation. In forested wetlands, trees are the dominant life form with a minimum of 30% areal coverage. "Needle-leaved evergreen" is a subclass of forested wetlands, which represents species like Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), Alaska cedar (*Callitropsis nootkatensis*), western red cedar (*Thuja plicata*), and lodgepole pine (*Pinus contorta*) (Cowardin et al. 1979). In scrub-shrub wetlands, woody plants less than 20 feet tall are the dominant life form. Persistent emergent plants are emergent hydrophytes that have stems and leaves year-round above the surface of the water, or soil, if water is absent. Persistent emergent wetlands contain a vast array of grass-like plants or broad-leaved persistent emergent vegetation.

Table 8. Wetland Classifications for the Benchlands and Harbor Mountain Road Parcels (Field Findings)

The Benchlands[1]	Yes	Palustrine Forested Wetland, Needle-Leaved Evergreen	PFO4B	UNK
Harbor Mountain Road[2]	Yes	Palustrine Forested Wetland, Needle-Leaved Evergreen	PFO4B	~16
		Palustrine Scrub-Shrub Wetland, Needle-Leaved Evergreen	PSS4B	~1.5
		Palustrine Persistent Emergent	PEM1B	~3
			Total	**~20.5**

[1] The area upslope from the platted parcels and roads at the Benchlands was visually observed to have vegetation similar to that recorded at forested wetland plots throughout the survey area. Wetland status was confirmed at one plot near the southern gate for the subdivision; areas upslope from the platted subdivision are expected to have a high likelihood of wetland presence.

[2] Wetlands at Harbor Mountain Road were mapped with a medium level of detail for planning purposes. A full wetland delineation would be needed to determine precise extents and areas for these wetlands.

4.0 POTENTIAL MITIGATION COSTS

In the event that impacts to waters of the United States (WOTUS) are unavoidable, USACE may require compensatory mitigation to offset the loss of wetland functions and values. Compensatory mitigation is at USACE's discretion, but is typically required when impacts exceed 1/10th of an acre and may involve the purchase of mitigation bank credits. The cost of credits varies by bank, and total mitigation costs will be dependent on the total impact area and impacted wetland functions. USACE's Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS) was used to determine potential wetland mitigation banks serving the Sitka area. Available credits and cost per credit were confirmed with each bank over the phone. As the project design advances and the extent of unavoidable wetland impacts is better defined, mitigation needs and associated costs can be refined and incorporated into the overall project budget. See Table 9 below for potential mitigation bank options serving the Sitka area.

Table 9. Potential Mitigation Banks Information (as of October 29, 2025)

Mitigation Banks Serving Sitka	Available Wetland Credits	Point of Contact (POC)	Cost per Credit
Natzuhini Bay Mitigation Bank (Palustrine Wetlands)	22.84	Jack Beckman Sales POC Email: Jack.beckman@sealaska.com Phone: 907-617-5167	$6,500 per 1/10th credit
Trillium Mitigation Bank (Wetlands)	86.271	Mara McGrath Senior Ecologist, Principal Email: Mara@eco-land.com Phone: 360-578-1371	$60,000 per credit & $2,500 transaction fee for public projects
Southeast Alaska Land Trust - Bruin Wetlands (Palustrine Mixed Wetlands)	4.6 140 advance credits (credits available in the future)	Stephanie Lawlor Conservation Manager Email: Stephanie@sealt.org Phone: 907-586-3100	$252,456 per credit

5.0 ANTICIPATED FUTURE EFFORTS

Investigators were on site from September 22nd to September 26th. Each parcel where wetlands had the potential to be present was assigned a priority ranking of 1-6 and would be visited in that order. This reconnaissance was intended to aid in site selection and provide preliminary data to be used in detailed wetland delineation(s) of the final selected site(s) and improve upon the U.S. Fish and Wildlife Service

NWI mapping, which relies on a single-parameter, aerial-imagery–based methodology that may overestimate wetland coverage.

Upper Edgecumbe Drive was assigned a priority ranking of 6 and was subsequently planned to be visited after the higher priority sites were surveyed. However, due to worsening weather conditions and landslide risks as the efforts progressed, the Upper Edgecumbe Drive parcel was excluded from the field survey efforts, and the remaining time was reallocated to collect additional data at the Gavan Hill and SHS parcels to constitute a wetland delineation. Sufficient data was collected to complete a wetland delineation in accordance with USACE guidelines.

A reconnaissance was performed at the Benchlands and Harbor Mountain Road to confirm the three USACE parameters. Collection of additional details was restricted due to weather conditions, landslide risks, and time constraints. Several sample plots were completed at the Benchlands and Harbor Mountain Road sites to generate a baseline for vegetation, soils, and hydrology. These findings, in addition to field observations, photographs, and desktop information, were used to estimate preliminary wetland boundaries. The results of the reconnaissance yielded preliminary wetland boundaries as well as mapping of Peterson Creek and the approximate riverbed boundary at the Indian River parcel.

As the project advances into subsequent phases and specific parcels are refined for residential housing feasibility, delineation efforts for the Benchlands and Harbor Mountain Road sites may range from desktop analysis to additional field study and survey, depending on the selected site and level of development. Additional field surveys to confirm the three USACE parameters at the Upper Edgecumbe Drive site are also recommended.

If the selected design is unable to avoid wetlands and results in impacts greater than 1/10th of an acre, the Corps may require a functional assessment of the impacted wetland(s) to determine the amount of credits needed for mitigation. Additional on-site analysis may be required to meet this condition and would be at the discretion of the USACE.

Investigators also reviewed eel grass presence at the Herring Cove sites; however, limited access options and cloudy/rainy weather conditions may impact findings. Additional surveys are recommended during negative tides to determine eel grass presence; a water-based survey would allow for optimal data collection and accessibility. Additionally, the presence of wetland plants at the high tide line of Herring Cove suggests that a portion of the shoreline may be marine or estuarine wetlands. Planning for future development should also consider this finding.

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Appendix A – Test Pit Photos

UPL-TP1


Sitka High School Trailhead, 700 Lake St, Sitka, AK 99835, USA
68°NE (T) 57.064258, -135.341333 ±4m ▲ 18m
SP01
Sitka housing
22 Sep 2025, 12:21:59 PM

UPL-TP2


S
SW
150
180
210
240
204°S (T) 57.064507, -135.339453 ±3m ▲ 27m
Sitka housing
SP02
22 Sep 2025, 2:46:15 PM

W-TP3


East
114°E (T) • 57.06322, -135.33053 ±3m ▲ 33m
SP03
Sitka housing
23 Sep 2025, 8:10:13 AM

W-TP4


East
109°E (T) 57.063610°N, 135.332513°W ±39ft 126ft
Sitka
TP 4, peat wetland
23 Sep 2025 09:21:14

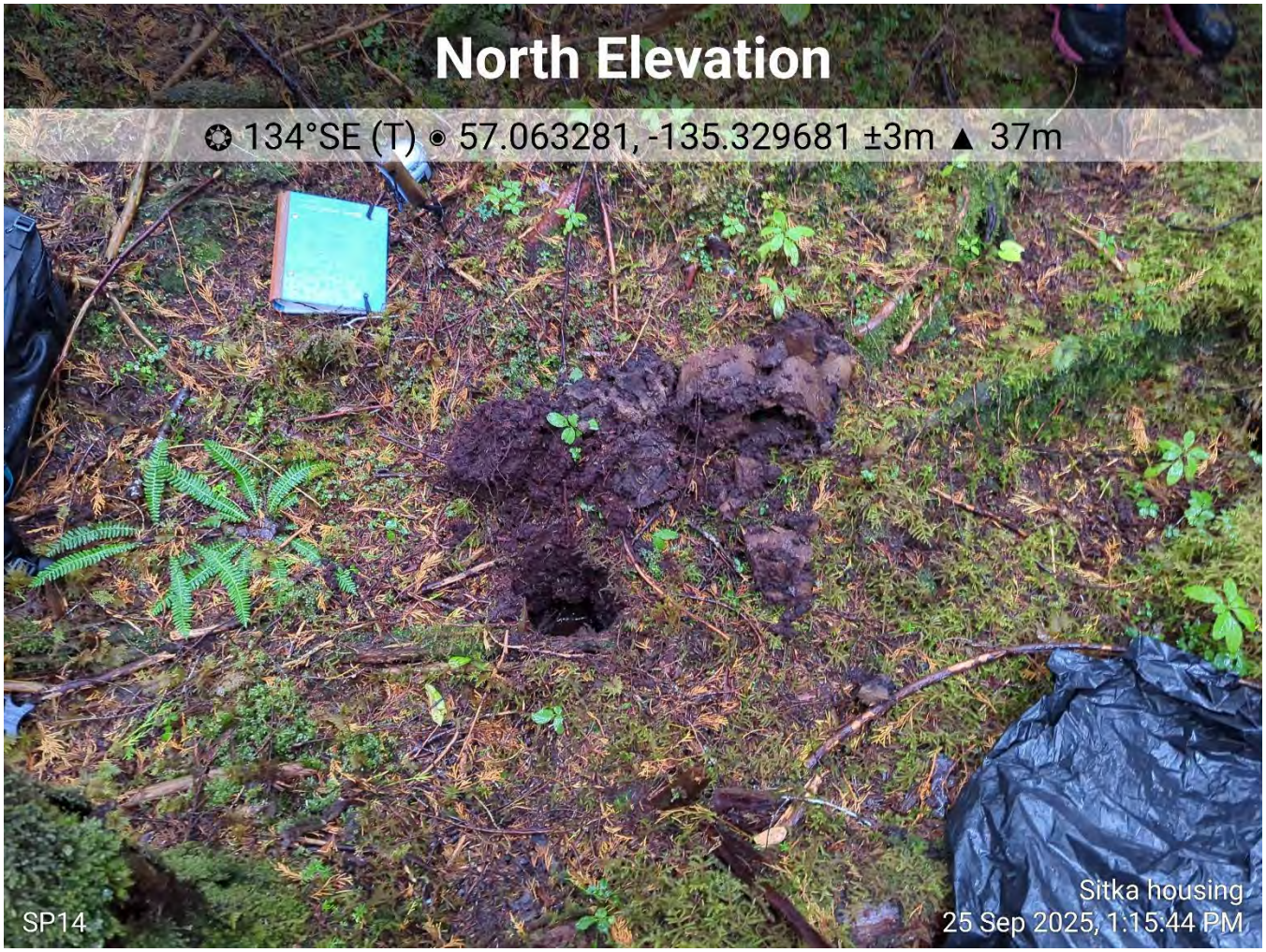
W-TP5


West
276°W (T) • 57.063962, -135.332386 ±3m ▲ 24m
SP05
Sitka housing
23 Sep 2025, 9:39:26 AM

W-TP13


West Elevation
100°E (T) 57.063275, -135.333402 ±3m ▲ 42m
SP13
Sitka housing
25 Sep 2025, 12:43:22 PM

UPL-TP14


North Elevation
134°SE (T) 57.063281, -135.329681 ±3m ▲ 37m
SP14
Sitka housing
25 Sep 2025, 1:15:44 PM

UPL-TP15


South Elevation
343°NW (T) • 57.064168, -135.332276 ±3m ▲ 31m
SP15
Sitka housing
25 Sep 2025, 1:48:37 PM

W-TP6


W
NW
240
270
300
330
291°W (T) • 57.062712, -135.337512 ±0m ▲ 27m
SP06
Sitka housing
23 Sep 2025, 12:15:39 PM

UPL-TP7


W
270
300
NW
330
N
0
306°NW (T) 57.061806, -135.337159 ±11m ▲ 30m
SP07
Sitka housing
23 Sep 2025, 1:19:04 PM

UPL-TP11


NE
E
SE
60
90
120
150
97°E (T) 57.080193, -135.374985 ±3m ▲ 26m
SP11
Sitka housing
24 Sep 2025, 1:25:33 PM

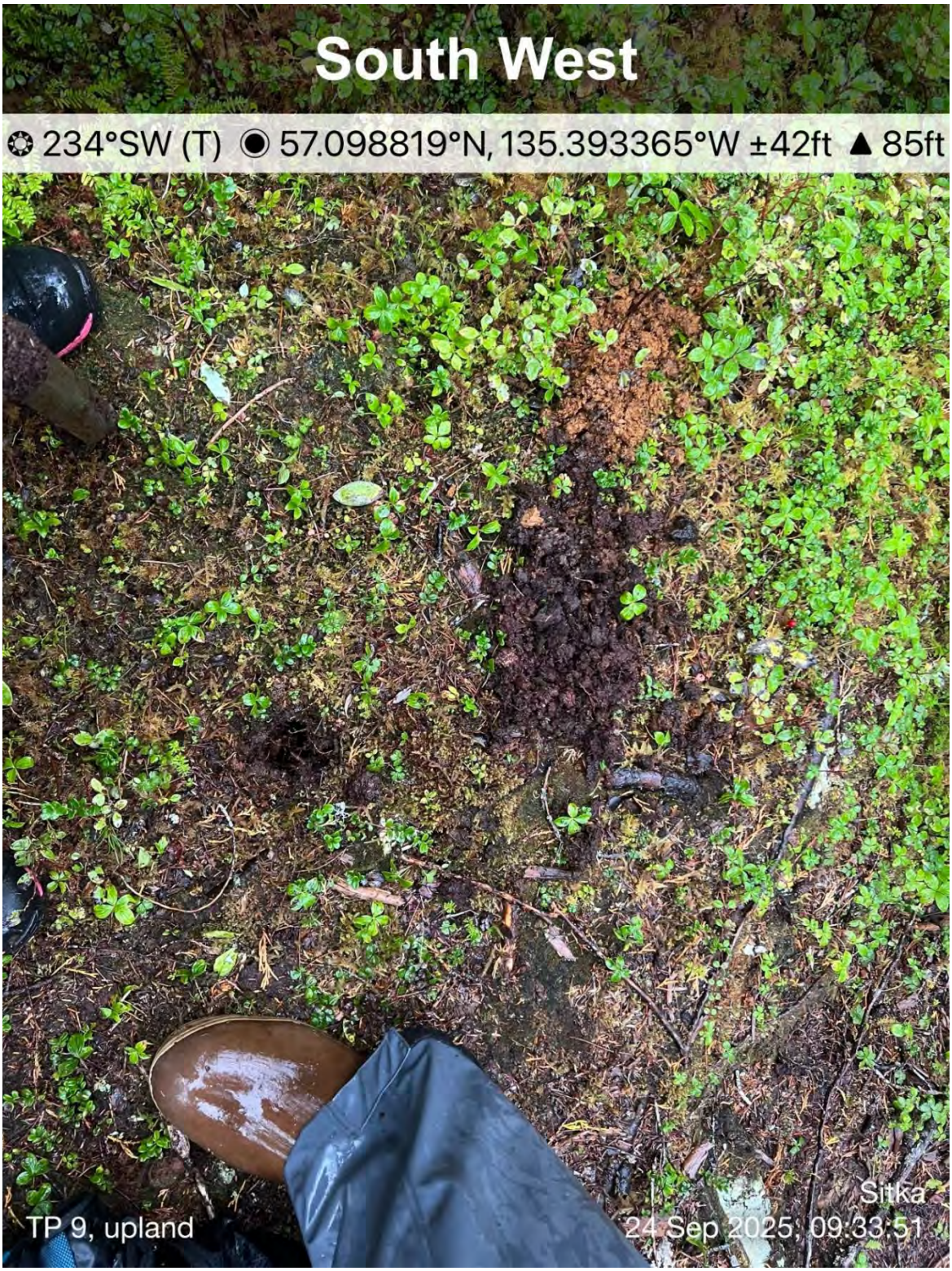
W-TP12


South Elevation
6°N (T) • 57.080091, -135.373128 ±4m ▲ 63m
SP12
Sitka housing
24 Sep 2025, 3:22:28 PM

W-TP8


E
90
SE
120
150
S
180
147°SE (T) 57.099416, -135.391277 ±3m ▲ 46m
SP08
Sitka housing
24 Sep 2025, 8:12:02 AM

UPL-TP9


South West
234°SW (T) 57.098819°N, 135.393365°W ±42ft 85ft
TP 9, upland
Sitka
24 Sep 2025, 09:33:51

UPL-TP10


North
15°N (T) 57.090304°N, 135.384480°W ±16ft 88ft
TP 10, upland
Sitka
24 Sep 2025, 11:44:27

Appendix B – Data Forms

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Study Borough/City: CBS Sampling Date: 9/25/25

Applicant/Owner: CBS Sampling Point: 15

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): terrace

Local relief (concave, convex, none): convex Slope (%): 10-15

Subregion: W Lat: 57.064168 Long: -135.332276 Datum: WGS84

Soil Map Unit Name: 5256B NWI classification: PFO4B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga heterophylla	15	N	fac
2. Thuja plicata	40	Y	fac-
3. Picea sitchensis	35	Y	facw
4.			
Total Cover:	90		
50% of total cover: 45	20% of total cover: 18		
Sapling/Shrub Stratum			
1. Vaccinium parvifolium	45	Y	facu
2. Menziesia ferruginea	60	Y	facu
3. Vaccinium ovalifolium	25		fac
4. Rubus spectabilis	5		facw
5. Cornus canadensis	7		facu
6.			
Total Cover:	142		
50% of total cover: 71	20% of total cover: 28.4		
Herb Stratum			
1. Rubus pedatus	10	Y	fac
2. Maianthemum dilatatum	3		fac
3. Lysochiton americanus	15	Y	obl
4. ~~Cornus canadensis~~	~~7~~		~~facu~~
5. Blechnum spicant	2		fac
6.	2		facu
7.			
8.			
9.			
10.			
Total Cover:	32		
50% of total cover: 16	20% of total cover: 6.4		

Plot size (radius, or length x width) 40 x 20 % Bare Ground 2

% Cover of Wetland Bryophytes _____ Total Cover of Bryophytes 60

(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 15	x 1 =	15
FACW species _____	x 2 =	
FAC species 50	x 3 =	150
FACU species 140	x 4 =	560
UPL species _____	x 5 =	
Column Totals: 205 (A)		725 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

Sampling Point: 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/2	100					Duff	
2-16	10YR2/1	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol or Histel (A1)
- ☐ Histic Epipedon (A2)
- ☐ Hydrogen Sulfide (A4)
- ☐ Thick Dark Surface (A12)
- ☐ Alaska Gleyed (A13)
- ☐ Alaska Redox (A14)
- ☐ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ☐ Alaska Color Change (TA4)[4]
- ☐ Alaska Alpine Swales (TA5)
- ☐ Alaska Redox With 2.5Y Hue
- ☐ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ☐ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: Did not dig past 16" because hydric vegatation was failed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained Leaves (B9)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Salt Deposits (C5)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-2

Water Table Present? Yes X No ____ Depth (inches): 1

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 10

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Prolonged rainfall. Water is seeping in on the uphill side of pit.

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Island Feasibility Study, J Borough/City: CBS Sampling Date: 9/25/25

Applicant/Owner: CBS Sampling Point: 14

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hillside

Local relief (concave, convex, none): convex Slope (%): 10-13

Subregion: W Lat: 57.063281 Long: -135.324681 Datum: WGS84

Soil Map Unit Name: 617B NWI classification: PF04B/PSS1/F04B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. ~~Callitropsis nootkatensis~~	40	Y	FAC-
2. Tsuga heterophylla	35	Y	FAC-
3.			
4.			
Total Cover: ~~75~~			
50% of total cover: 37.5	20% of total cover: 15		
Sapling/Shrub Stratum			
1. Vaccinium parvifolium	15	Y	FACU-
2. Menziesia ferruginea	7	Y	FACU
3. Tsuga heterophylla	5		FAC
4.			
5.			
6.			
Total Cover: ~~27~~			
50% of total cover: 13.5	20% of total cover: 5.4		
Herb Stratum			
1. Rubus pedatus	2		FAC
2. Maianthemum dilatatum	3	Y	FAC
3. Dryopteris expansa	4	Y	FACU
4. Linnaea borealis	5	Y	FACU
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: ~~14~~			
50% of total cover: 7	20% of total cover: 2.8		

Plot size (radius, or length x width) r= 20 % Bare Ground 20

% Cover of Wetland Bryophytes ____ (Where applicable) Total Cover of Bryophytes 75

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 43 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 = ____	
FACW species ____	x 2 = ____	
FAC species 78	x 3 = 234	
FACU species 34	x 4 = 136	
UPL species ____	x 5 = ____	
Column Totals: 112 (A)	370 (B)	

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					Peat	
8-10	2.5Y 4/2	100					Sandy loam	
10-16	10YR 4/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol or Histel (A1)
- ☐ Histic Epipedon (A2)
- ☐ Hydrogen Sulfide (A4)
- ☐ Thick Dark Surface (A12)
- ☐ Alaska Gleyed (A13)
- ☐ Alaska Redox (A14)
- ☐ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ☐ Alaska Color Change (TA4)[4]
- ☐ Alaska Alpine Swales (TA5)
- ☐ Alaska Redox With 2.5Y Hue
- ☐ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ☐ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: mineral soil w/ chroma 2 or less, layer is 2 inches thick,

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained Leaves (B9)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Salt Deposits (C5)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-2

Water Table Present? Yes X No ____ Depth (inches): 8

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 2

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Prolonged heavy rains impacted sampling.

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Study Borough/City: CBS Sampling Date: 9/25/25
Applicant/Owner: CBS Sampling Point: 13
Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hillside
Local relief (concave, convex, none): convex Slope (%): 0-5
Subregion: W Lat: 57.063275 Long: -135.333402 Datum: WGS84
Soil Map Unit Name: 617B NWI classification: PSSI/FO4B
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea sitchensis	40	Y	facw
2. Tsuga heterophylla	25		fac
3. ~~Callitropsis nootkatensis~~			~~fact~~
4.			
Total Cover: 65			
50% of total cover: 32.5	20% of total cover: 13		
Sapling/Shrub Stratum			
1. Menziesia ferruginea	45	Y	facw
2. Vaccinium ovalifolium	25	Y	fac
3. Vaccinium parvifolium	30	Y	facu
4. ~~Lysichiton americanus~~			~~obl~~
5. Tsuga heterophylla	4		fac
6. Picea sitchensis	5		facw
Total Cover: 104			
50% of total cover: 54.5	20% of total cover: 21		
Herb Stratum			
1. Lysichiton americanus	10	Y	obl
2. Rubus pedatus	7	Y	fac
3. Maianthemum dilatatum	3		fac
4. Dryopteris expansa	2		facw
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 22			
50% of total cover: 11	20% of total cover: 4.4		

Plot size (radius, or length x width) r=20ft % Bare Ground 10
% Cover of Wetland Bryophytes ____ (Where applicable) Total Cover of Bryophytes ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	~~65~~	x 2 =	
FAC species	32	x 3 =	96
FACU species	115	x 4 =	460
UPL species		x 5 =	
Column Totals:	157 (A)		566 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:
- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	100					muck peat	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [X] Histosol or Histel (A1)
- [ ] Histic Epipedon (A2)
- [ ] Hydrogen Sulfide (A4)
- [ ] Thick Dark Surface (A12)
- [ ] Alaska Gleyed (A13)
- [ ] Alaska Redox (A14)
- [ ] Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- [ ] Alaska Color Change (TA4)[4]
- [ ] Alaska Alpine Swales (TA5)
- [ ] Alaska Redox With 2.5Y Hue
- [ ] Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- [ ] Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [X] Surface Water (A1)
- [X] High Water Table (A2)
- [X] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Dry-Season Water Table (C2)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-1

Water Table Present? Yes X No ____ Depth (inches): 4

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 4

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface water draining off slope following prolonged rainfall.

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Study Borough/City: CBS Sampling Date: 9/24/25

Applicant/Owner: CBS Sampling Point: 12

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hillside

Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion: W Lat: 57.080091 Long: -135.373128 Datum: WGS84

Soil Map Unit Name: 5141B NWI classification: PF04B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. ~~Thuja plicata~~ Callitropsis nootkatensis	15	Y	facw
2. Tsuga heterophylla	15	Y	facw
3. Picea sitchensis	5		
4.			
Total Cover:	35		
50% of total cover: 17.5	20% of total cover: 7		

Sapling/Shrub Stratum			
1. Menziesia ferruginea	20		facu
2. Vaccinium ovalifolium	40	Y	fac
3. Tsuga heterophylla	25	Y	facw
4. Picea sitchensis	7		facu
5. Callitropsis nootkatensis	5		facw
6. Cornus canadensis	25	Y	facu
Total Cover:	122		
50% of total cover: 61	20% of total cover: 24.4		

Herb Stratum			
1. Lysichiton americanus	30	Y	obl
2. ~~Cornus canadensis~~	~~25~~	~~Y~~	~~facu~~
3. Blechnum spicant	10	Y	facw
4. Linnaea borealis	5		facu
5. Coptis asplenifolium	3		facw
6.			
7.			
8.			
9.			
10.			
Total Cover:	48		
50% of total cover: 24	20% of total cover: 9.6		

Plot size (radius, or length x width) r=20ft % Bare Ground 21

% Cover of Wetland Bryophytes ____ Total Cover of Bryophytes 85

(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/4	100					Duff	
2-16	10YR 2/2	100					Peaty muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [x] Histosol or Histel (A1)
- [ ] Histic Epipedon (A2)
- [x] Hydrogen Sulfide (A4)
- [ ] Thick Dark Surface (A12)
- [ ] Alaska Gleyed (A13)
- [ ] Alaska Redox (A14)
- [ ] Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- [ ] Alaska Color Change (TA4)[4]
- [ ] Alaska Alpine Swales (TA5)
- [ ] Alaska Redox With 2.5Y Hue
- [ ] Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- [ ] Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [x] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Marl Deposits (B15)
- [x] Hydrogen Sulfide Odor (C1)
- [ ] Dry-Season Water Table (C2)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-1

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Study Borough/City: CBS Sampling Date: 9/24/25

Applicant/Owner: CBS Sampling Point: 11

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hillside

Local relief (concave, convex, none): Convex Slope (%): 5-10

Subregion: W Lat: 7,090,193 Long: -135.3T4985 Datum: WGS84

Soil Map Unit Name: 5141B NWI classification: PF04B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Thuja plicata	Y	25	fac
2. Tsuga heterophylla	Y	65	fac
3.			
4.			
Total Cover: 90			
50% of total cover: 45	20% of total cover: 18		
Sapling/Shrub Stratum			
1. Vaccinium ovalifolium	Y	7	fac
2. Vaccinium parvifolium		2	facU
3. Rubus spectabilis		3	facU
4. Menziesia ferruginea	Y	6	facU
5.			
6.			
Total Cover: ~~18~~ 18			
50% of total cover: 9	20% of total cover: 3.6		
Herb Stratum			
1. Maianthemum dilatatum	Y	5	Fac
2. Coptis asplenifolia		2	fac
3. Rubus pedatus	Y	7	fac
4. Blechnum spicant	Y	4	fac
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: ~~18~~ 18			
50% of total cover: 9	20% of total cover: 3.6		

Plot size (radius, or length x width) r= 20ft % Bare Ground 45

% Cover of Wetland Bryophytes ____ (Where applicable) Total Cover of Bryophytes ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ~~86~~ 86 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 = ____	
FACW species ____	x 2 = ____	
FAC species ____	x 3 = ____	
FACU species ____	x 4 = ____	
UPL species ____	x 5 = ____	
Column Totals: 0 (A)	0 (B)	

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					Peat	
10-12	10YR 3/1	100					loamy sand	
12-20	10YR 4/4	100					loamy sand.	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol or Histel (A1)
- ☐ Histic Epipedon (A2)
- ☐ Hydrogen Sulfide (A4)
- ☐ Thick Dark Surface (A12)
- ☐ Alaska Gleyed (A13)
- ☐ Alaska Redox (A14)
- ☐ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ☐ Alaska Color Change (TA4)[4]
- ☐ Alaska Alpine Swales (TA5)
- ☐ Alaska Redox With 2.5Y Hue
- ☐ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ☐ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: Fails A2, lacks saturation and high water table.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained Leaves (B9)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Salt Deposits (C5)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Study Borough/City: CBS Sampling Date: 9/24/25

Applicant/Owner: CBS Sampling Point: 10

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hillside

Local relief (concave, convex, none): convex Slope (%): 0-3

Subregion: W Lat: 57.09030 Long: -135.38480 Datum: WGS84

Soil Map Unit Name: 5121B NWI classification: PF04B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga heterophylla	65	Y	fac-
2. Callitropsis nootkatensis	20		fac
3. Alnus rubra	25	Y	fac-
4.			
Total Cover:	110		
50% of total cover: 55	20% of total cover: 22		
Sapling/Shrub Stratum			
1. Vaccinium ovalifolium	10	Y	fac-
2. Tsuga heterophylla	5		fac
3. Vaccinium parvifolium	5		FACU
4. Menziesia ferruginea	7	Y	fac-
5. Cornus canadensis	4		facU
6.			
Total Cover:	31		
50% of total cover: 15.5	20% of total cover: 6.2		
Herb Stratum			
1. Blechnum spicant	7	Y	fac-
2. Lycopus americanus	5	Y	obl
3. [illegible]			
4. Rubus pedatus	3		FAC
5. Coptis trifolia	2		FAC
6.			
7.			
8.			
9.			
10.			
Total Cover:	17		
50% of total cover: 8.5	20% of total cover: 3.4		

Plot size (radius, or length x width) r=20 ft % Bare Ground 60

% Cover of Wetland Bryophytes ____ Total Cover of Bryophytes ____

(Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR2/2	100					Peat	
8-16	10YR 2/1	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol or Histel (A1)
- ☐ Histic Epipedon (A2)
- ☐ Hydrogen Sulfide (A4)
- ☐ Thick Dark Surface (A12)
- ☐ Alaska Gleyed (A13)
- ☐ Alaska Redox (A14)
- ☐ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ☐ Alaska Color Change (TA4)[4]
- ☐ Alaska Alpine Swales (TA5)
- ☐ Alaska Redox With 2.5Y Hue
- ☐ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ☐ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

fails A2, no saturation or high water table.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained Leaves (B9)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Salt Deposits (C5)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Slightly convex.

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Study Borough/City: CBS Sampling Date: 9/24/25

Applicant/Owner: CBS Sampling Point: 9

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hillside

Local relief (concave, convex, none): complex Slope (%): 0-5

Subregion: W Lat: 57.048819 Long: -135.343365 Datum: W

Soil Map Unit Name: 5121B NWI classification: PFO4B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus contorta	20	Y	fac
2. Tsuga heterophylla	40	Y	fac
3. Callitropsis nootkatensis	15	Y	fac
4.			

Total Cover: 75

50% of total cover: 37.5 20% of total cover: 15

Sapling/Shrub Stratum			
1. Tsuga heterophylla	15	Y	fac
2. Vaccinium ovalifolium	10		fac
3. Menziesia ferruginea	30	Y	facu
4. Vaccinium parvifolium	5		facu
5. Vaccinium vitis-idaea	2		fac
6. Cornus canadensis	10		fac

Total Cover: 73

50% of total cover: 36.5 20% of total cover: 14.6

Herb Stratum			
1. ~~Cornus canadensis~~	~~10~~	~~Y~~	~~fac~~
2. ~~Vaccinium vitis-idaea~~			
3. Coptis asplenifolia	30		fac
4. Blechnum spicant	2	Y	fac
5. Linnaea borealis	3	Y	facu
6. Rubus pedatus	1		fac
7.			
8.			
9.			
10.			

Total Cover: 71

50% of total cover: 3.5 20% of total cover 1.4

Plot size (radius, or length x width) r=20 ft % Bare Ground 20

% Cover of Wetland Bryophytes ____ Total Cover of Bryophytes ____ (Where applicable)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71.4 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100					loam	
12-20+	7.5YR 4/6	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol or Histel (A1)
- ☐ Histic Epipedon (A2)
- ☐ Hydrogen Sulfide (A4)
- ☐ Thick Dark Surface (A12)
- ☐ Alaska Gleyed (A13)
- ☐ Alaska Redox (A14)
- ☐ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ☐ Alaska Color Change (TA4)[4]
- ☐ Alaska Alpine Swales (TA5)
- ☐ Alaska Redox With 2.5Y Hue
- ☐ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ☐ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: Soils appear to be compressed from foot traffic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained Leaves (B9)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Salt Deposits (C5)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility study Borough/City: CBS Sampling Date: 9/24/25

Applicant/Owner: CBS Sampling Point: 8

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hillside

Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion: W Lat: 57.094416 Long: -135.391277 Datum: WGS84

Soil Map Unit Name: 512B NWI classification: PFO4B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Callitropsis nootkatensis	~50	Y	fac*
2. Tsuga heterophylla	15	Y	fac*
3. Picea sitchensis	5		facU
4.			
Total Cover: 70			
50% of total cover: 35	20% of total cover: 14		
Sapling/Shrub Stratum			
1. Tsuga heterophylla	30	Y	fac*
2. Vaccinium ovalifolium	35	Y	fac*
3. Menziesia ferruginea	25	Y	facU*
4. Vaccinium parvifolium	7		facU
5. Cornus canadensis	15		facU
6.			
Total Cover: 112			
50% of total cover: 56	20% of total cover: 22.4		
Herb Stratum			
1. ~~Tsuga heterophylla~~	15	Y	~~facU~~
2. ~~Vaccinium ovalifolium~~			~~fac~~
3. Coptis asplenifolia	5		fac
4. Rubus pedatus	3		fac
5. Lysichiton americanus	7	Y	obl
6. Carex mertensii	4		facW
7. Carex ~~pauci~~ plurifibra	3		obl
8. Linnea borealis	17	Y	facU*
9.			
10.			
Total Cover: 34			
50% of total cover: 19.5	20% of total cover: 7.8		

Plot size (radius, or length x width) r=20ft % Bare Ground 1

% Cover of Wetland Bryophytes _____ (Where applicable) Total Cover of Bryophytes 90

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71.4 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 2/2	100					Peaty muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [X] Histosol or Histel (A1)
- [ ] Histic Epipedon (A2)
- [ ] Hydrogen Sulfide (A4)
- [ ] Thick Dark Surface (A12)
- [ ] Alaska Gleyed (A13)
- [ ] Alaska Redox (A14)
- [ ] Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- [ ] Alaska Color Change (TA4)[4]
- [ ] Alaska Alpine Swales (TA5)
- [ ] Alaska Redox With 2.5Y Hue
- [ ] Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- [ ] Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [X] Surface Water (A1)
- [ ] High Water Table (A2)
- [X] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Dry-Season Water Table (C2)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5) (facu dominant)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-2

Water Table Present? Yes X No ____ Depth (inches): 16

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Heavy rains. Surface water around microdepressions & skunk cabbage.

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Borough/City: CBS Sampling Date: 9/23
Applicant/Owner: CBS Sampling Point: 7
Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): Slope
Local relief (concave, convex, none): convex Slope (%): 0-10
Subregion: W Lat: 57.061800 Long: -135.337159 Datum: WGS84
Soil Map Unit Name: 617AB NWI classification: PSS1/F04B
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga heterophylla	70	Y	fac-
2.			
3.			
4.			
Total Cover: 70			
50% of total cover: —	20% of total cover: —		
Sapling/Shrub Stratum			
1. Vaccinium parvifolium	50	Y	facu
2. Tsuga heterophylla	5		fac
3. Vaccinium ovalifolium	15		fac-
4. Menziesia ferruginea	35	Y	facu
5. Rubus spectabilis	7		facu
6.			
Total Cover: 112			
50% of total cover: 56	20% of total cover: 22.4		
Herb Stratum			
1. Athyrium cyclosorum	3	Y	fac-
2. Rubus pedatus	5	Y	fac-
3. Mianthemum dilatatum	1		fac
4. Dryopteris expansa	2		facu
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 11			
50% of total cover: 5.5	20% of total cover: 2.2		

Plot size (radius, or length x width) r=20ft % Bare Ground 10
% Cover of Wetland Bryophytes _____ Total Cover of Bryophytes _____
(Where applicable)

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	5YR 2.5/1	100					Duff	
2-3	10YR 2/1	100					Sandy loam	
3-4	2.5Y 5/3	100					loamy sand	
4-13	10YR 2/1	100					Sandy loam	
13-20	10YR 3/4	100					Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol or Histel (A1)
- ☐ Histic Epipedon (A2)
- ☐ Hydrogen Sulfide (A4)
- ☐ Thick Dark Surface (A12)
- ☐ Alaska Gleyed (A13)
- ☐ Alaska Redox (A14)
- ☐ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ☐ Alaska Color Change (TA4)[4]
- ☐ Alaska Alpine Swales (TA5)
- ☐ Alaska Redox With 2.5Y Hue
- ☐ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ☐ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained Leaves (B9)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Salt Deposits (C5)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Study Borough/City: CBS Sampling Date: 9/28/25
Applicant/Owner: CBS Sampling Point: 6
Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): Concave Slope (%): 0-3
Subregion: W Lat: 57.062712 Long: -135.337512 Datum: WGS84
Soil Map Unit Name: 6174B NWI classification: PSS1/F04B
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum			
1. Tsuga heterophylla	Y	25	fac
2. Picea sitchensis	Y	10	facw
3. Pinus contorta		7	fac
4.			
Total Cover: 42			
50% of total cover: 21	20% of total cover: 8.4		
Sapling/Shrub Stratum			
1. Rhododendron groenlandicum	Y	15	fac
2. Tsuga heterophylla	Y	35	fac
3. Menziesia ferruginea		10	facw
4. Vaccinium ovalifolium		5	fac
5. Empetrum nigrum		5	fac
6. Vaccinium parvifolium		7	facw
Vaccinium vitis-idaea		5	fac
Vaccinium uliginosum		7	fac
Total Cover: 96			
50% of total cover: 48	20% of total cover: 19.2		
Herb Stratum			
1. Cornus canadensis [moved to sapling]		1	facw
2. Lysichiton americanus		5	obl
3. Carex pluriflora	Y	60	obl
4. Carex mertensii	Y	50	facw
5. Coptis aspleniifolia		3	fac
6.			
7.			
8.			
9.			
10.			
Total Cover: 118			
50% of total cover: 59	20% of total cover: 23.6		

Plot size (radius, or length x width) 20ft=r % Bare Ground 2
% Cover of Wetland Bryophytes ____ (Where applicable) Total Cover of Bryophytes 95

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16+	10YR 3/2	100					Mucky peat	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [X] Histosol or Histel (A1)
- [ ] Histic Epipedon (A2)
- [ ] Hydrogen Sulfide (A4)
- [ ] Thick Dark Surface (A12)
- [ ] Alaska Gleyed (A13)
- [ ] Alaska Redox (A14)
- [ ] Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- [ ] Alaska Color Change (TA4)[4]
- [ ] Alaska Alpine Swales (TA5)
- [ ] Alaska Redox With 2.5Y Hue
- [ ] Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- [ ] Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [X] Surface Water (A1)
- [X] High Water Table (A2)
- [X] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Dry-Season Water Table (C2)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-2

Water Table Present? Yes X No ____ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Borough/City: CBS Sampling Date: 9/23/25

Applicant/Owner: CBS Sampling Point: # 5

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): Drainage

Local relief (concave, convex, none): concave Slope (%): 0-3

Subregion: W Lat: 57.063962 Long: -135.332386 Datum: WGS84

Soil Map Unit Name: 5256B NWI classification: PEMB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga heterophylla	45	Y	fac
2. Picea sitchensis	20	Y	facw
3. Thuja plicata	10	–	fac
4.			
Total Cover:	75		
50% of total cover: 37.5	20% of total cover: 15		
Sapling/Shrub Stratum			
1. Vaccinium ovalifolium	55	Y	fac
2. Vaccinium parvifolium	10	–	fac
3. Rubus spectabilis	2	–	facw
4. Menziesia ferruginea	7	–	fac
5.			
6.			
Total Cover:	74		
50% of total cover: 37	20% of total cover: 14.8		
Herb Stratum			
1. Lysichiton americanus	65	Y	obl
2. Athyrium cyclosorum	3	–	fac
3. Blechnum spicant	2	–	fac
4. Tiarella trifoliata	5	–	fac
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover:	75		
50% of total cover: 37.5	20% of total cover: 15		

Plot size (radius, or length x width) r= 20 ft % Bare Ground 5

% Cover of Wetland Bryophytes _____ (Where applicable) Total Cover of Bryophytes 25

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: Red huckleberry is growing on stumps and logs.

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					mucky peat	
3-16+	10YR2/2	100					muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [X] Histosol or Histel (A1)
- [ ] Histic Epipedon (A2)
- [ ] Hydrogen Sulfide (A4)
- [ ] Thick Dark Surface (A12)
- [ ] Alaska Gleyed (A13)
- [ ] Alaska Redox (A14)
- [ ] Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- [ ] Alaska Color Change (TA4)[4]
- [ ] Alaska Alpine Swales (TA5)
- [ ] Alaska Redox With 2.5Y Hue
- [ ] Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- [ ] Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [X] Surface Water (A1)
- [X] High Water Table (A2)
- [X] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Dry-Season Water Table (C2)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-2

Water Table Present? Yes X No ____ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Study Borough/City: ~~CBB~~ CBS Sampling Date: 9/23/25

Applicant/Owner: CBS Sampling Point: 4

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hillside

Local relief (concave, convex, none): concave Slope (%): 0-3

Subregion: W Lat: 57.063610 Long: -135.332513 Datum: WGS84

Soil Map Unit Name: 61MB NWI classification: PFO4B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus contorta	30	Y	fac-
2. Picea sitchensis	7		fac
3.			
4.			
Total Cover:	~~45~~ 37		
50% of total cover: 18.5	20% of total cover: 7.4		

Sapling/Shrub Stratum			
1. Picea sitchensis	5	Y	facu
2. Tsuga heterophylla	7	Y	fac-
3. Menziesia ferruginea	5	Y	facu
4. Vaccinium alaskaense	2		fac
5. Cornus canadensis	5	Y	facu
6.			
Total Cover:	24		
50% of total cover: 12	20% of total cover: 48		

Herb Stratum			
1. Sanguisorba canadensis	2 ~~5~~		facw
2. Carex mertensii	75	Y	facw
3. Lysichiton americanus	~~5~~ 10		obl
4. ~~Fragaria chiloensis~~	~~5~~		~~fac~~
5. Coptis asplenifolia	2		fac
6. Calamagrostis canadensis	~~45~~ 30	Y	fac-
7.			
8.			
9.			
10.			
Total Cover:	119		
50% of total cover: 59.5	20% of total cover 23.8		

Plot size (radius, or length x width) r=20 ft % Bare Ground 2

% Cover of Wetland Bryophytes ____ (Where applicable) Total Cover of Bryophytes ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57.1 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR 2.5/3	100					Peat	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [X] Histosol or Histel (A1)
- [ ] Histic Epipedon (A2)
- [ ] Hydrogen Sulfide (A4)
- [ ] Thick Dark Surface (A12)
- [ ] Alaska Gleyed (A13)
- [ ] Alaska Redox (A14)
- [ ] Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- [ ] Alaska Color Change (TA4)[4]
- [ ] Alaska Alpine Swales (TA5)
- [ ] Alaska Redox With 2.5Y Hue
- [ ] Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- [ ] Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [X] Surface Water (A1)
- [X] High Water Table (A2)
- [X] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Marl Deposits (B15)
- [X] Hydrogen Sulfide Odor (C1)
- [ ] Dry-Season Water Table (C2)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-5

Water Table Present? Yes X No ____ Depth (inches): 1 inch

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land feasibility study Borough/City: CBS Sampling Date: 9/23/25

Applicant/Owner: CBS Sampling Point: #3

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): hummocks

Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion: W Lat: 57.06322 Long: -135.33053 Datum: WGS84

Soil Map Unit Name: 617B NWI classification: PF04B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga heterophylla	20	y	fac-
2. Callitropsis nootkatensis	10	y	fac-
3.			
4.			
Total Cover: 30			
50% of total cover: 15	20% of total cover: 6		
Sapling/Shrub Stratum			
1. Rhododendron groenlandicum	70	Y	fac-
2. Tsuga heterophylla	5		fac
3. Menziesia ferruginea	25		fac-
4. Vaccinium ovalifolium	15		fac
5. Vaccinium vitis-idaea	20		fac
6. Empetrum nigrum	5		fac
Picea sitchensis → Vaccinium parvifolium → Total Cover: 187			
50% of total cover: 93.5	20% of total cover: 37.4		
Herb Stratum			
1. Cornus canadensis [moved to sapling]	45	y	facu
2. Lysichiton americanus	4		obl
3. Carex pluriflora	75	y	obl-
4. carex mertensii	60	y	facw-
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 139			
50% of total cover: 69.5	20% of total cover: 27.8		

Plot size (radius, or length x width) r=20ft % Bare Ground 1

% Cover of Wetland Bryophytes _____ Total Cover of Bryophytes 75

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16+	10YR 2/1	100	none				Peat	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [x] Histosol or Histel (A1)
- [ ] Histic Epipedon (A2)
- [ ] Hydrogen Sulfide (A4)
- [ ] Thick Dark Surface (A12)
- [ ] Alaska Gleyed (A13)
- [ ] Alaska Redox (A14)
- [ ] Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- [ ] Alaska Color Change (TA4)[4]
- [ ] Alaska Alpine Swales (TA5)
- [ ] Alaska Redox With 2.5Y Hue
- [ ] Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- [ ] Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Dry-Season Water Table (C2)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [x] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): —

Water Table Present? Yes ____ No X Depth (inches): —

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Heavy rains, hemlock + Sitka spruce are stunted ° saturation following heavy rainfall, but heavy rains are not uncommon at this time of year. Hydrogen sulfide smell + surface water within 10 m at sample plot.

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS Land Feasibility Study Borough/City: CBS Sampling Date: 9/22/25

Applicant/Owner: CBS Sampling Point: #2

Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): Slopes

Local relief (concave, convex, none): concave Slope (%): 5-10

Subregion: Lat: 57.064507 Long: -135.339453 Datum: WGS84

Soil Map Unit Name: 5256B NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga heterophylla	30	Y	FAC-
2. Picea sitchensis	40	Y	FACW
3.			
4.			

Total Cover: 70

50% of total cover: 35 20% of total cover: 14

Sapling/Shrub Stratum			
1. Rubus spectabilis	30	Y	FACW
2. vaccinium ovalifolium	2		FAC
3.			
4.			
5.			
6.			

Total Cover: 32

50% of total cover: 16 20% of total cover: 6.4

Herb Stratum			
1. Athyrium cyclosorum	50	Y	FAC
2. Tiarella trifoliata	60	Y	FAC
3. Maianthemum dilatatum	1		FAC
4. Dryopteris expansa	7		FACW
5.			
6.			
7.			
8.			
9.			
10.			

Total Cover: 118

50% of total cover: 59 20% of total cover: 23.6

Plot size (radius, or length x width) 20 ft = r % Bare Ground 7

% Cover of Wetland Bryophytes ____ (Where applicable) Total Cover of Bryophytes ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.6 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 =	____
FACW species ____	x 2 =	____
FAC species ____	x 3 =	____
FACU species ____	x 4 =	____
UPL species ____	x 5 =	____
Column Totals: 0 (A)		0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR2/1	100					peaty muck	
1-3	10YR5/2	100					Rocky silty sand	
3-18	7.5YR 3/3	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol or Histel (A1)
- ☐ Histic Epipedon (A2)
- ☐ Hydrogen Sulfide (A4)
- ☐ Thick Dark Surface (A12)
- ☐ Alaska Gleyed (A13)
- ☐ Alaska Redox (A14)
- ☐ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ☐ Alaska Color Change (TA4)[4]
- ☐ Alaska Alpine Swales (TA5)
- ☐ Alaska Redox With 2.5Y Hue
- ☐ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ☐ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-stained Leaves (B9)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Salt Deposits (C5)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: saturation only on 0-1 muck layer, after hand rub

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: CBS land feasibility study Borough/City: CBS Sampling Date: 9/22/25
Applicant/Owner: CBS Sampling Point: #1
Investigator(s): S Roskam; J Ngo Landform (hillside, terrace, hummocks, etc.): Slope
Local relief (concave, convex, none): concave Slope (%): 0-5
Subregion: W Lat: 57.064258 Long: -135.341333 Datum: WGS84
Soil Map Unit Name: 5141B NWI classification: PFO4B
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea sitchensis	75	Y	facu
2. Tsuga heterophylla	10		fac
3.			
4.			
Total Cover: 85.0			
50% of total cover: 42.5	20% of total cover: 17		
Sapling/Shrub Stratum			
1. Vaccinium ovalifolium	3	Y	fac
2. Menziesia ferruginea	7	Y	facu
3. Vaccinium parvifolium	1		facu
4.			
5.			
6.			
Total Cover: 11			
50% of total cover: 5.5	20% of total cover: 2.2		
Herb Stratum			
1. Lysichiton americanus	35	Y	obl
2. Athyrium cyclosorum	5		fac
3. Blechnum spicant	1		fac
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 41			
50% of total cover: 20.5	20% of total cover: 8.2		

Plot size (radius, or length x width) r = 20ft % Bare Ground 2
% Cover of Wetland Bryophytes ____ (Where applicable) Total Cover of Bryophytes 75

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 35	x 1 = 35
FACW species ____	x 2 = ____
FAC species 3	x 3 = 9
FACU species 82	x 4 = 328
UPL species ____	x 5 = ____
Column Totals: 120 (A)	= 372 (B)

Prevalence Index = B/A = 3.10

Hydrophytic Vegetation Indicators:
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 2-1		100				Peaty muck	
16-20	7.5 YR 2.5/2		100				gravelly sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [X] Histosol or Histel (A1)
- [ ] Histic Epipedon (A2)
- [ ] Hydrogen Sulfide (A4)
- [ ] Thick Dark Surface (A12)
- [ ] Alaska Gleyed (A13)
- [ ] Alaska Redox (A14)
- [ ] Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- [ ] Alaska Color Change (TA4)[4]
- [ ] Alaska Alpine Swales (TA5)
- [ ] Alaska Redox With 2.5Y Hue
- [ ] Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- [ ] Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [X] Surface Water (A1)
- [X] High Water Table (A2)
- [X] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Dry-Season Water Table (C2)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 0-3

Water Table Present? Yes X No ____ Depth (inches): 12 inch

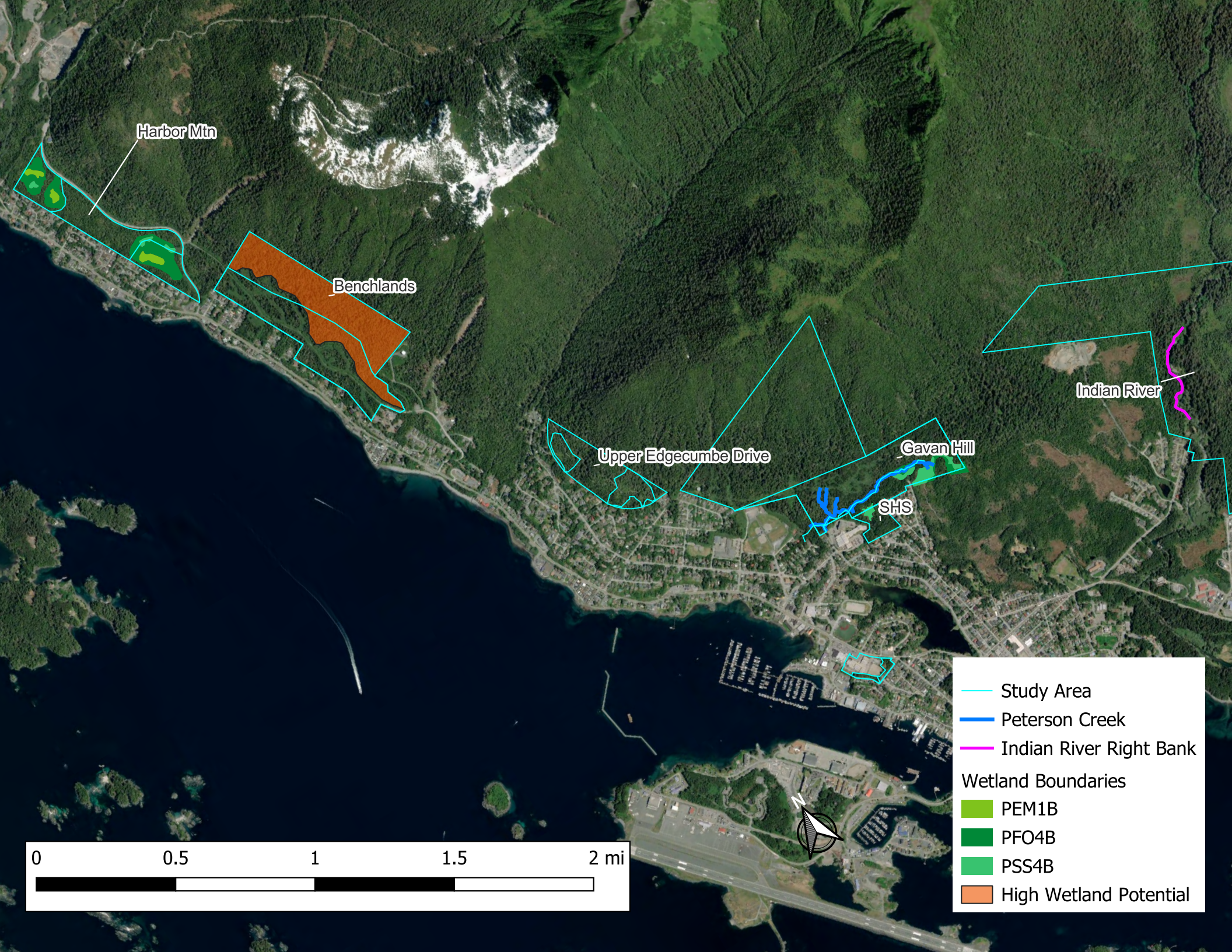
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

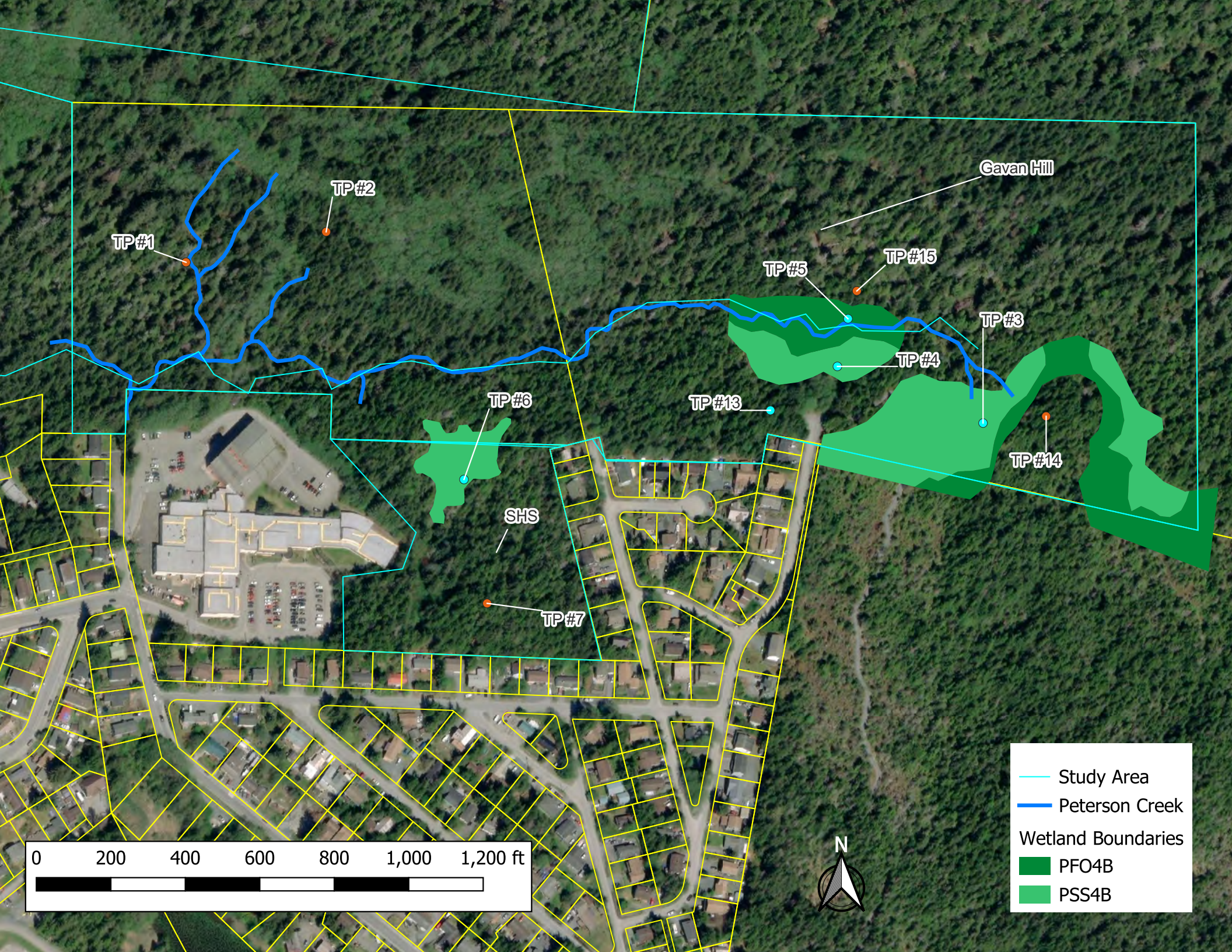
Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C – Maps


Harbor Mtn
Benchlands
Upper Edgecumbe Drive
Gavan Hill
SHS
Indian River
Study Area
Peterson Creek
Indian River Right Bank
Wetland Boundaries
PEM1B
PFO4B
PSS4B
High Wetland Potential
N
0
0.5
1
1.5
2 mi


TP #1
TP #2
Gavan Hill
TP #5
TP #15
TP #3
TP #4
TP #13
TP #6
TP #14
SHS
TP #7
0
200
400
600
800
1,000
1,200 ft
N
Study Area
Peterson Creek
Wetland Boundaries
PFO4B
PSS4B

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Appendix F. Decision Matrix Criteria and Ratings Descriptions

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LAND SUITABILITY AND FEASIBILITY DECISION MATRIX CRITERIA AND RATINGS DESCRIPTIONS

PND PROJECT NO. 242091 **DATE: November 24, 2025**
PROJECT: Land Suitability and Feasibility Study

1. INTRODUCTION AND METHOD

This document is intended to accompany the City and Borough of Sitka Land Suitability and Feasibility Study (LSFS) Decision Matrix. The matrix employs the Multi-Criteria Decision Analysis (MCDA) method to rank the development potential of each study site. MCDA method is a structured framework used to evaluate and compare multiple options based on a range of diverse and sometimes competing criteria. Rather than relying on a single measure of performance, MCDA allows decision-makers to systematically incorporate technical, economic, environmental, and social considerations into the evaluation process. Each criterion is assigned a weight to reflect its relative importance, and each alternative is scored according to how well it meets those criteria. This structured scoring approach provides a transparent, repeatable, and defensible means of identifying the most balanced or optimal alternative among complex choices.

Within MCDA, the scoring system typically involves normalizing and weighting criteria to ensure fair and consistent comparison. Normalization converts raw scores—often expressed in different units or scales—into a common range (such as 0 to 1 or 0 to 100), preventing any single criterion from disproportionately influencing results due to its magnitude or unit of measure. Once normalized, each score is multiplied by its respective weight factor to reflect the criterion's relative significance. The resulting weighted scores are then summed to produce a composite score for each option, allowing for clear, quantitative ranking while maintaining the ability to interpret trade-offs among competing priorities.

When completing the MCDA scoring matrix, evaluators should independently assess how well each option meets the defined criteria, assigning a score based solely on the performance of that option relative to the criterion—not in comparison to the other alternatives. This approach ensures objectivity and reduces bias that can occur when options are informally ranked against one another. Evaluators should carefully review the definitions and scoring scales provided for each criterion and apply them consistently across all options. The goal is to produce an impartial and transparent assessment of each alternative's individual merits so that, once all scores are combined and weighted, the final results reflect a balanced and defensible comparison grounded in the established evaluation framework.

2. CRITERIA AND RATINGS DESCRIPTIONS

The following criteria and rating scales are applied to the LSFS Decision Matrix. Weight factors for each criterion are identified in the Decision Matrix.

Constructability – Total Category Weight, 57.5%

The items in this category relate to the constructability of the site. While cost estimates have not yet been developed, constructability items consider factors that will impact overall project cost. All criteria apply only to areas deemed buildable within the parcel, generally defined as those with slopes of 15% or less based on available LIDAR topographic data.

1. Slide Risk Factors – Weight, 20%

How close is the buildable area to locations with slide risk factors? What is the potential for the buildable area to be impacted by landslides or debris flows?

Ratings (1 = Best, 3 = Worst):

1 – Low Vulnerability
2 – Moderate Vulnerability
3 – High Vulnerability

2. Construction Access - Weight, 12.5%

As it relates to construction access, is there suitable access to the buildable areas, and how close is the nearest access point? Are buildable areas contiguous, or would multiple mobilizations be required for construction?

Ratings (1 = Best, 3 = Worst):

1 – Good Construction Access
2 – Average Construction Access
3 – Poor Construction Access

3. Physical Conditions - Weight, 15%

Are the existing site conditions conducive to construction? Consider general topography, geotechnical conditions, wetland prevalence, hydrologic setting and the amount of clearing required within the buildable areas.

Ratings (1 = Best, 3 = Worst):

1 – Highly Conducive to Development
2 – Conducive to Development
3 – Minimally Conducive to Development

4. Proximity to Utilities - Weight, 15%

How close are existing utilities (water, sewer, electrical) that could be extended to the buildable areas? Is there adequate right-of-way (ROW), easements, or city-owned property between the nearest utilities and the site, or will land procurement/easements be required? Are there clear paths, or will roadways/utility corridors need to be constructed? This criterion is not intended to consider the capacity of the closest utilities, only their existence.

Ratings (1 = Best, 3 = Worst):

1 – Good Access
2 – Moderate Access
3 – Poor Access

Density Potential – Total Category Weight, 37.5%

The items in this category relate to the potential, or lack of potential, for high-density development.

5. Buildable Area – Weight 12.5%

Total anticipated buildable area (generally, areas with slopes of 15% or less).

Ratings (1 = Most Buildable, 5 = Least Buildable):

1 – More than 25 acres
2 – 15–25 acres
3 – 5–15 acres
4 – 2–5 acres
5 – Fewer than 2 acres

6. Utility Capacity – Weight 15%

In the context of density potential, are the existing utilities adequate to support additional development, and to what degree? If upgrades are needed, to what extent and how much work would be required to complete them?

Ratings (1 = Best, 4 = Worst):

1 – Adequate existing capacity to support buildout; minimal improvements needed
2 – Nearby utilities have capacity, but some improvements/extensions necessary
3 – Nearby utilities have some available capacity, but improvements/extensions required for full buildout
4 – Extensive improvements needed prior to any development

7. Transportation Capacity – Weight 10%

In the context of density potential, are existing roadways adequate to support additional traffic, and to what degree? If upgrades are needed, to what extent and how much work would be required to construct them?

Ratings (1 = Best, 4 = Worst):

1 – Adequate existing capacity and ROW; minimal improvements needed
2 – Nearby roads have capacity, but some improvements/extensions necessary; adequate ROW
3 – Roadway improvements/extensions needed, but adequate ROW available
4 – Extensive roadway improvements needed; extensive ROW procurements necessary

Desirables – Total Category Weight, 5%

The items in this category are desirable considerations that may be more subjective or have less overall cost impact. However, they represent factors of public interest or community value.

8. Environmental Impact – Weight 3%

Environmental and cultural impacts to anticipated buildout areas. Consider potential impacts to wetlands, cultural resources, and recreational areas, as well as the level of permitting anticipated.

Ratings (1 = Best, 3 = Worst):

1 – Minimal impacts anticipated; limited or no permitting required.
2 – Some impacts expected; moderate permitting and mitigation likely.
3 – Significant impacts likely; extensive permitting and mitigation required.

9. Proximity to Services – Weight 2%

How close is the site to human services such as medical care, schools, and shopping?

Ratings (1 = Best, 3 = Worst):

1 – Walkable to most services, downtown areas.
2 – Near and/or readily accessible via public transportation
3 – Distant and/or requires private transportation

Appendix G. Decision Matrix

Instructions:	Key
In the yellow colored boxes, input scores for each option and criteria according to the scoring system defined in the "Definition of Criteria" column.	Input score here
	Highest scored option
All other cells update automatically.	Lowest scored option

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Land Feasibiltiy and Suitability Study - Site Selection Decision Matrix

Category		Decision Factors		Options and Scoring																							Definition of Criteria
		Criteria	Weight %	Site 1 - Gavan Hill			Site 2- SHS			Site 3 - Upper Edgecumbe Dr.			Site 4 - Benchlands			Site 5 - Harbor Mountain			Site 6 - Green Lake Road			Site 7 - Hering Cove Peninsula			Site 8 - Osprey St.			
				Input Score	Normalized Score	Weighted and Normalized Score	Input Score	Normalized Score	Weighted and Normalized Score	Input Score	Normalized Score	Weighted and Normalized Score	Input Score	Normalized Score	Weighted and Normalized Score	Input Score	Normalized Score	Weighted and Normalized Score	Input Score	Normalized Score	Weighted and Normalized Score	Input Score	Normalized Score	Weighted and Normalized Score	Input Score	Normalized Score	Weighted and Normalized Score	
Constructability	1	Slide Risk Factors	20.0%	2	0.50	0.10	1	1.00	0.20	3	0.33	0.07	3	0.33	0.07	2	0.50	0.10	3	0.33	0.07	2	0.50	0.10	1	1.00	0.20	Vulnerability to Slide Risk Factors. 1 = Low Vulnerability 2 = Moderate Vulnerability 3 = High Vulnerability
	2	Construction Access	12.5%	2	0.50	0.06	1	1.00	0.13	3	0.33	0.04	1	1.00	0.13	2	0.50	0.06	2	0.50	0.06	2	0.50	0.06	1	1.00	0.13	Existing access available to site for construction equipment and future roadways 1 = Good Construction Access 2 = Average Construction Access 3 = Poor Construction Access
	3	Physical Conditions	15.0%	2	0.50	0.08	2	0.50	0.08	3	0.33	0.05	2	0.50	0.08	3	0.33	0.05	3	0.33	0.05	3	0.33	0.05	1	1.00	0.15	Conducive conditions for construction including geotechnical, wetland prevalence, hydrologic, clearing required. 1 = Highly conducive 2 = Conducive 3 = Minimally conducive
	4	Proximity to Utilities	10.0%	2	0.50	0.05	1	1.00	0.10	3	0.33	0.03	2	0.50	0.05	2	0.50	0.05	3	0.33	0.03	3	0.33	0.03	1	1.00	0.10	Proximity to existing utility services 1 = Good Access 2 = Moderate Access 3 = Poor Access
Density Potential	5	Buildable Area	12.5%	1	1.00	0.13	3	0.33	0.04	3	0.33	0.04	1	1.00	0.13	1	1.00	0.13	1	1.00	0.13	5	0.20	0.03	5	0.20	0.03	Potential buildable area (15% or lower grade) 1 = More than 25 acres 2 = 15-25 acres 3 = 5-15 acres 4 = 2-5 acres 5 = Fewer than 2 acres
	6	Utility Capacity	15.0%	3	0.33	0.05	2	0.50	0.08	3	0.33	0.05	4	0.25	0.04	2	0.50	0.08	4	0.25	0.04	4	0.25	0.04	1	1.00	0.15	Existing utility capacity, ability to develop without significant utility improvements 1 – Adequate existing capacity to support buildout; minimal improvements needed 2 – Nearby utilities have capacity, but some improvements/extensions necessary 3 – Nearby utilities have some available capacity, but improvements/extensions required for full buildout 4 – Extensive improvements needed prior to any development
	7	Transportation Capacity	10.0%	3	0.33	0.03	2	0.50	0.05	4	0.25	0.03	2	0.50	0.05	2	0.50	0.05	4	0.25	0.03	3	0.33	0.03	1	1.00	0.10	Existing roadways near development have capacity/are built to support additional traffic 1 = Adequate Existing Capacity and ROW / minimal improvements needed. 2 = Nearby Roads have capacity, but some improvements/extensions necessary. Adequate ROW. 3 = Roadway improvements/extensions needed, but adequate right of way. 4 = Extensive roadway improvements needed, extensive ROW procurements necessary.
Desirables	8	Environmental Impact	3.0%	3	0.33	0.01	1	1.00	0.03	2	0.50	0.02	2	0.50	0.02	3	0.33	0.01	3	0.33	0.01	3	0.33	0.01	1	1.00	0.03	Environmental impacts/ level of anticipated environmental permitting 1 = Minimal impacts & anticipated permitting 2 = Some impacts & moderate permitting 3 = Significant impacts & intensive permitting
	9	Proximity to Services	2.0%	1	1.00	0.02	1	1.00	0.02	1	1.00	0.02	2	0.50	0.01	2	0.50	0.01	3	0.33	0.01	3	0.33	0.01	1	1.00	0.02	Proximity to services: schools, government, medical, shopping, etc. 1 = Walkable 2 = Near and/or proximate to public transportation 3 = Distant and/or requires private transportation
			100.0%	Overall Scores*		52.58			71.67			34.38			55.42			53.25			41.67			35.83			90.00	

Score Summary by Category

Major Category	Total Weight	Site 1 Score*	Site 1 Rank	Site 2 Score*	Site 2 Rank	Site 3 Score*	Site 3 Rank	Site 4 Score*	Site 4 Rank	Site 5 Score*	Site 5 Rank	Site 6 Score*	Site 6 Rank	Site 7 Score*	Site 7 Rank	Site 8 Score*	Site 8 Rank	Major Category
Constructability	57.5%	28.75	4	50.00	2	19.17	8	31.67	3	26.25	5	21.25	7	24.58	6	57.50	1	Constructability
Density Potential	37.5%	20.83	4	16.67	6	11.67	7	21.25	3	25.00	2	18.75	5	9.58	8	27.50	1	Density Potential
Desirables	5.0%	3.00	4	5.00	1	3.50	3	2.50	5	2.00	6	1.67	7	1.67	7	5.00	1	Desirables
Totals	100.0%	52.58	5	71.67	2	34.33	8	55.42	3	53.25	4	41.67	6	35.83	7	90.00	1	

*Note matrix scores multiplied by 100 for clarity.

Overall Scoring Summary

Rank	Site	Score
1	Osprey Street	90.00
2	SHS	71.67
3	Benchlands	55.42
4	Harbor Mountain	53.25
5	Gavan Hill	52.58
6	Green Lake Road	41.67
7	Herring Cove Peninsula	35.83
8	Upper Edgecumbe Dr.	34.33

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