

Presented by: COW  
Presented: 11/13/2023  
Drafted by: R. Palmer III

## **ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA**

### **Serial No. 2023-18(am)**

#### **An Ordinance Amending the City and Borough of Juneau Code Related to Development in Landslide and Avalanche Hazard Areas.**

WHEREAS, the City and Borough of Juneau (CBJ) currently regulates development in landslide and avalanche zones based on hazard maps created in 1987 and associated standards, primarily in the Land Use Code (Title 49); and

WHEREAS, in 2020, the CBJ contracted with Tetra Tech to update the landslide and avalanche maps, which resulted in the new maps dated April 27, 2022; and

WHEREAS, in 2.3 “How are Avalanche Hazards Designated” of Tetra Tech’s Guide to Avalanche-Landslide Hazard Designations dated April 27, 2022 (at PDF page 206 of page 289), Tetra Tech described the following specific to avalanches:

The level of assessment prepared for this project is suitable for determining whether land areas could be affected by avalanches. A more detailed site-specific investigation and evaluation would be required to determine appropriate mitigations for specific properties; and

WHEREAS, in 3.3 “How are Landslide Hazards Designated” of Tetra Tech’s Guide to Avalanche-Landslide Hazard Designations dated April 27, 2022 (at PDF page 220 of page 289), Tetra Tech described the following specific to landslides:

The level of assessment prepared for this project is suitable for determining whether land areas could be affected by landslides. A more detailed site-specific investigation and evaluation would be required to determine appropriate mitigations for specific properties; and

WHEREAS, given the scope of Tetra Tech’s avalanche assessments, the ability for the Community Development Director to permit certain developments, like a house (Section 7, 49.70.300(b)(1)); the ability for the Planning Commission to permit other developments ((Section 7, 49.70.300(b)(2)); and the ability for a property owner to adjust the hazard boundary (Section 7, 49.70.300(a)(4); this ordinance reasonably balances the need to protect public health and safety with individual property owner interests; and

WHEREAS, regulating development in mapped landslide and avalanche hazard areas presents challenging public policy concerns like balancing the need for housing, minimizing harm to people and investments, providing hazard information to people in hazard areas, considering the economic effects that adopting new development regulations would have on property insurance and mortgage availability, considering that only portions of the CBJ have been mapped for landslide and avalanche hazards, among other public policies; and

WHEREAS, state law (A.S. 09.65.070(d)(1)) provides the CBJ with immunity from money damages when the CBJ fails to inspect, discover, or abate a hazard on private property; and

WHEREAS, state law (A.S. 09.65.070(d)(2)) provides the CBJ with immunity for money damages when the CBJ performs or fails to perform a discretionary function; and

WHEREAS, state law (A.S. 09.65.070(d)(3)) provides the CBJ with immunity for money damages when the CBJ issues or fails to issue a permit, appeal, approval, exception, variance, or other entitlement; and

WHEREAS, the Assembly would like the Manager to notify the community of avalanche risks and resources to mitigate some of the risks; and

WHEREAS, upon balancing the various public policies, the Assembly believes the community is best served by (1) regulating developments in moderate and severe avalanche hazard areas based on Tetra Tech's Snow Avalanche Hazard Assessment of the Juneau Landslide and Avalanche Hazard Assessment, dated April 27, 2022, Ord. 2023-18(am) Appendix A, and (2) repealing the substantive landslide regulations in CBJC 49.70.300; and

WHEREAS, the Assembly reached the conclusion after considering various other policy approaches, reviewing the Planning Commission's discussions, holding extensive public meetings in committees and at the Assembly, and taking public testimony.

NOW THEREFORE BE IT ENACTED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

**Section 1. Classification.** This ordinance is of a general and permanent nature and shall become a part of the City and Borough of Juneau Municipal Code.

**Section 2. Amendment of Section.** CBJC 19.04.R301.9 Geophysical hazards, is amended to read:

**19.04.R301.9 Geophysical hazards.**

Add a new section as follows:

"301.9 Geophysical hazards. In moderate and severe avalanche hazard areas shown on the Avalanche Hazard Designation Mapping, dated April 27, 2022, and attached to Ordinance 2023-18(am) as Appendix A, or when the director of engineering and public works determines that

development is proposed in an area similar in nature to those studied in the above referenced documents but outside of the study area, an engineered structural analysis shall be submitted with the permit application."

**Section 3. Amendment of Section.** CBJC 49.15.330 Conditional use permit, is amended to read:

**49.15.330 Conditional use permit.**

...

(g) Specific conditions. The commission may alter the director's proposed permit conditions, impose its own, or both. Conditions may include one or more of the following:

...

(9) Avalanche areas. Development in moderate and severe avalanche hazard areas shown on the Avalanche Hazard Designation Mapping, dated April 27, 2022, and attached to Ordinance 2023-18(am) as Appendix A, must minimize the risk to life and property.

...

**Section 4. Amendment of Section.** CBJC 49.15.401 Minor subdivisions, is amended to read:

**49.15.401 Minor subdivisions.**

(a) Permit required. A minor subdivision permit is required for the following:

(1) Thirteen or fewer lots. A minor subdivision permit is required for all subdivisions resulting in 13 or fewer lots. No minor subdivision application may be filed or approved:

(A) If it is a part of or is made in connection with a present or projected major subdivision development as determined by the director;

(B) If the property is within a parcel any part of which has been subdivided by a minor subdivision within the preceding 24 months, unless the proposed subdivision creates no new lots; or

(C) For the subdivision of a parcel any part of which is within an avalanche area identified as such in the comprehensive plan, attachments thereto, other adopted maps, or in accordance with CBJ 49.70.300.

...

**Section 5 Amendment of Section.** CBJC 49.15.600 [Planned Unit Development] Purpose, is amended to read:

**49.15.600 Purpose.**

The general purpose of the planned unit development code is to permit flexibility in the regulation and use of land in order to promote its most appropriate use; to facilitate the adequate and economical provisions of streets and utilities; to preserve the natural and scenic qualities of open space; and to encourage, consistent with the goals and objectives of the comprehensive plan, residential developments that are planned, designed, and developed to function as integral units. The specific purposes of the planned unit development code are to:

- (a) Encourage uses of land that are efficient, aesthetic, in harmony with the surrounding area, and consistent with the comprehensive plan and available public services;
- (b) Encourage innovation in site design and building layout, pedestrian and vehicular circulation, parking facilities and streets, configuration and use of open space, and mixing of housing types and compatible land uses;
- (c) Encourage economy and efficiency in common facilities;
- (d) Preserve and protect natural features, streams, lakes, wetlands, natural drainage channels, vegetation, and vistas;
- (e) Avoid avalanche and flood hazard areas; and
- (f) Encourage development of quality housing at a reasonable price.

**Section 6. Amendment of Section.** CBJC 49.70.210 [Article II. Hillside Development] Applicability and scope, is amended to read:

**49.70.210 Applicability and scope.**

- (a) This article applies to all development on hillsides in the City and Borough that involves the following:
  - (1) Removal of vegetative cover;
  - (2) Excavation of any slope in excess of 18 percent;
  - (3) Creation of a new slope in excess of 18 percent for a vertical distance of at least five feet; and
  - (4) Development in moderate and severe avalanche hazard areas shown on the Avalanche Hazard Designation Mapping, dated April 27, 2022, and attached to Ordinance 2023-18(am) as Appendix A.

...

**Section 7. Amendment of Section.** CBJC 49.70.300 Landslide and avalanche areas, is amended to read:

**49.70.300 Avalanche hazard areas.**

(a) Generally.

- (1) Minimize risks. Development in all avalanche hazard areas should minimize the risk of loss of life or property due to avalanches.
- (2) Avalanche Hazard Maps. The boundaries of avalanche hazard areas are shown on the Avalanche Hazard Designation Mapping, dated April 27, 2022, and attached to Ordinance 2023-18(am) as Appendix A.
- (3) Reserved.
- (4) Hazard boundary adjustment. If a developer disagrees with the boundaries shown on the maps, the developer may seek departmental relocation of the boundaries by submitting site specific studies prepared by a civil engineer licensed in the State of Alaska or a licensed geotechnical engineer. Such studies shall include detailed analyses of topography, vegetation, potential snow accumulation, and other factors. The results should indicate actual hazard area boundaries and potential debris flow direction, time, distance, and mass. If, in the opinion of the director of engineering and public works, the studies clearly establish that the map boundaries are inaccurate and the proposed development is outside a moderate or severe avalanche area, the department shall proceed accordingly.
- (5) The director for moderate avalanche hazard areas and the commission for severe avalanche hazard areas may require mitigating measures certified as effective by a professional engineer for development in avalanche areas. Such measures may include dissipating structures or dams, special structural engineering, or other techniques designed for the site. Mitigating measures may also include reduction in the proposed density, occupancy, and development.

(b) Moderate and severe avalanche hazard area standards. Notwithstanding any other provision of this title, no development or any part of a development may occur in a moderate or severe avalanche hazard area except as provided in this section.

- (1) Director approval in a moderate avalanche hazard area. The director may only approve the following in a moderate avalanche hazard area:
  - (A) a permit for a single dwelling unit per parcel;
  - (B) a hazard boundary line adjustment;

- (C) a lot line adjustment when the resulting lots are more compliant with this title and the resulting lots would likely reduce the risk to life and property; and
  - (D) a lot consolidation.
- (2) Commission approval in a moderate or severe avalanche hazard area. The commission may approve developments in the moderate and severe avalanche hazard areas—including accessory dwelling units—via the conditional use permit process with the following additional requirements:
- (A) The development application must include site specific engineering for peak drainage, special foundations or high-wall engineering, debris flow diversion mechanisms, and any other information required by the commission, for the commission to evaluate the potential effects of the development on public health and safety; and
  - (B) No subdivision shall be approved that creates a lot lacking sufficient building space outside a severe avalanche area—without the need for a variance—unless a lot in a severe avalanche area is platted as a Public Use Lot (49.15.422); and
  - (C) The commission is prohibited from approving a development application that increases residential density in the severe avalanche hazard area, except that the commission may authorize development of one dwelling unit on a vacant lot in a severe avalanche hazard area.

(c) Warning and disclaimer of liability. Avalanches may occur outside mapped hazard areas and in excess of engineering expectations. The location and severity of the event may be increased by human or natural causes. This article does not imply that land outside of mapped hazard areas, or uses permitted within such areas, will be free from danger or damage. This article shall not create liability on the part of the City and Borough of Juneau or any officer or employee thereof for any damages that result from reliance of this article, or any administrative decision made under this article.

**Section 8. Amendment of Section.** CBJC 49.85.100 [Chapter 49.85 Fees for Land Use Actions] Generally, is amended to read:

**49.85.100 Generally.**

Processing fees are established for each development, platting, and other land use action in accordance with the following schedule:

...

- (8) Special use or area.

...

(F) Development in avalanche hazard area conditional use, \$400.00.

...

**Section 9.** Amendment of Chapter. CBJC 49.70 Sensitive Areas, is amended by adding a new section to read:

**49.70.305 Landslide hazard assessment disclaimer.** The following disclaimer should appear on or be associated with Tetra Tech’s mapping related to the Landslide Hazard Designation figures 1.6a-j (10 pages), dated, April 27, 2022:

The City and Borough of Juneau did not adopt these landslide hazard assessment maps. The landslide hazard assessment maps do not consider any human-made structures or mitigating measures. The landslide hazard assessment maps do not provide an indication of risk as would be necessary to determine whether landslide hazards actually pose a threat to specific properties. A more detailed site-specific investigation and evaluation would be required to determine risk to and appropriate mitigations for specific properties.

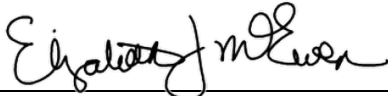
**Section 10. Effective Date.** This ordinance shall be effective 30 days after its adoption.

Adopted this 11<sup>th</sup> day of December 2023.



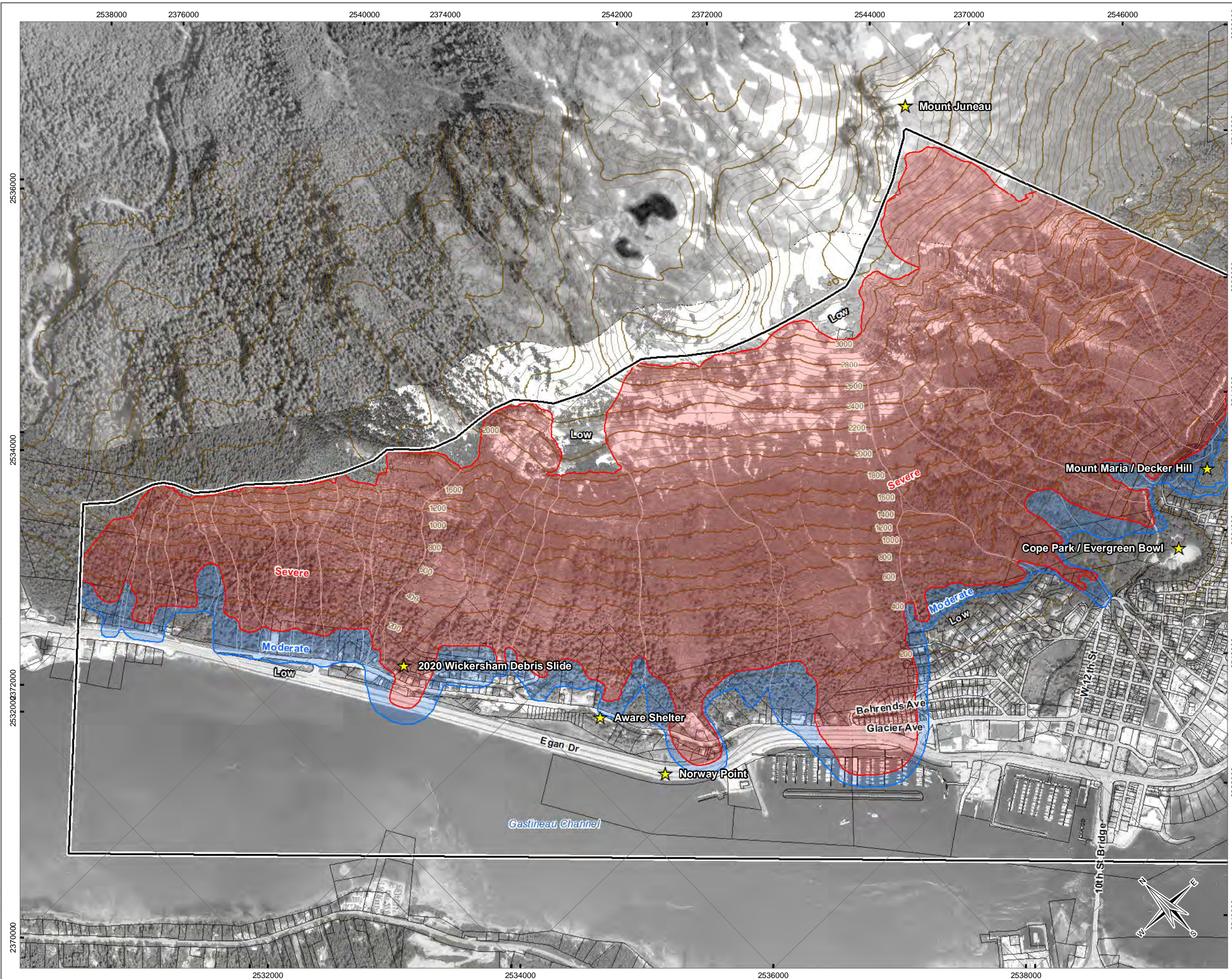
Beth A. Weldon, Mayor

Attest:



Elizabeth J. McEwen, Municipal Clerk





### LEGEND

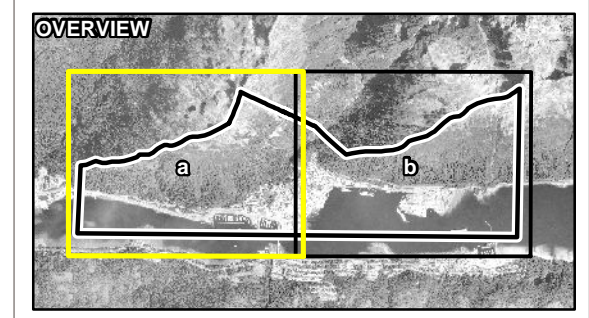
- Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)

**Base Data**

- Index Contour (200 ft)
- Intermediate Contour (50 ft)
- Land Parcel

**AVALANCHE HAZARD DESIGNATION**

- Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
- Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
- Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).



**NOTES**

Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".

Base data source:  
Land parcels provided by CBJ.  
Contours generated from 2013 LiDAR provided by CBJ.  
Background contours generated from 2012 LiDAR provided by CBJ.  
Primary imagery provided by CBJ, 2013.  
Background imagery provided by ESRI; Maxar (2020).

STATUS  
ISSUED FOR USE

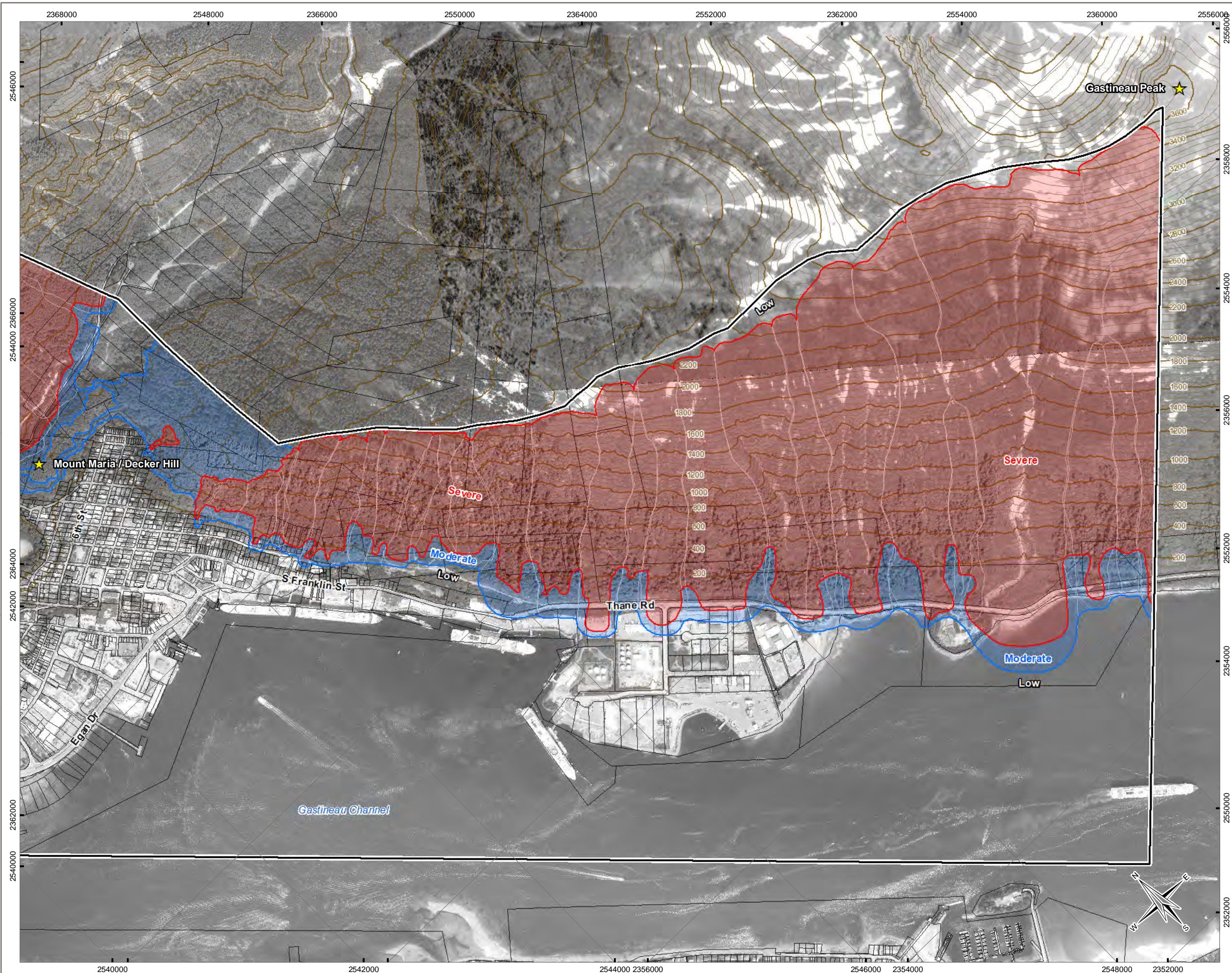
## JUNEAU LANDSLIDE AND AVALANCHE ASSESSMENT

### Avalanche Hazard Designation Mapping Overview

<b>PROJECTION</b> State Plane Alaska Zone 1 5001		<b>DATUM</b> NAD83		<b>CLIENT</b> CITY AND BOROUGH OF <b>JUNEAU</b> ALASKA	
Scale: 1:12,500					
<b>FILE NO.</b> 19-0017-JUN-002					
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ	<b>APVD</b> AJ	<b>REV</b> 2	<b>Figure 2.3a</b>
<b>DATE</b> April 27, 2022	<b>PROJECT NO.</b> 19-0017-JUN				

C:\Users\chris\Dropbox (D&C)\Terra Tech - Juneau - 19-0017-JUN\Maps\GIS Data\City of Juneau\_FIG2-3\_Av Designation\_Overview\_20220420.mxd modified 2022-04-27 by chris





**LEGEND**

- ★ Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)

**Base Data**

- Index Contour (200 ft)
- Intermediate Contour (50 ft)
- Land Parcel

**AVALANCHE HAZARD DESIGNATION**

- Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
- Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
- Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).

**OVERVIEW**

**NOTES**

Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
 Base data source:  
 Land parcels provided by CBJ.  
 Contours generated from 2013 LiDAR provided by CBJ.  
 Background contours generated from 2012 LiDAR provided by CBJ.  
 Primary imagery provided by CBJ, 2013.  
 Background imagery provided by ESRI; Maxar (2020).

STATUS  
ISSUED FOR USE

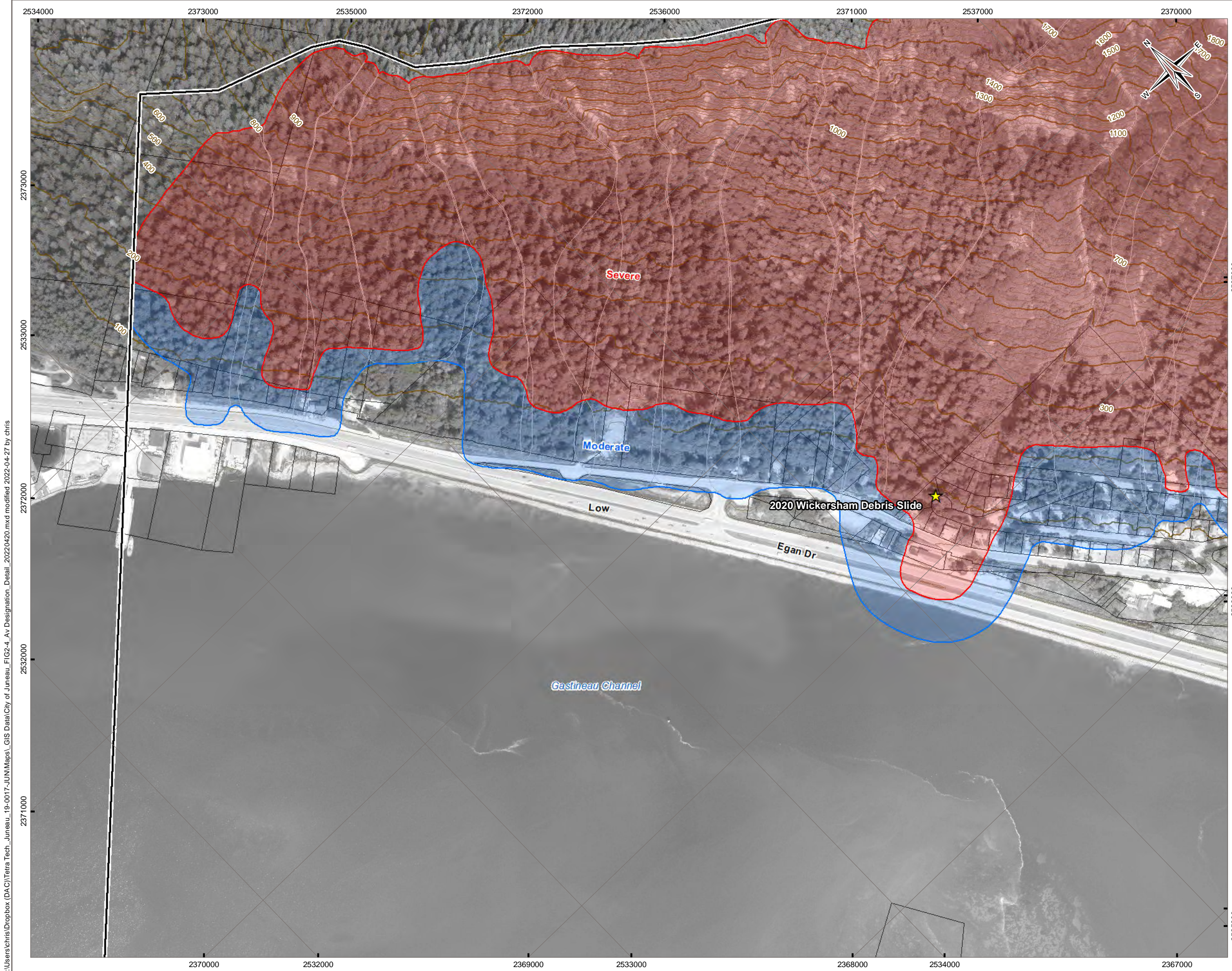
**JUNEAU LANDSLIDE AND  
AVALANCHE ASSESSMENT**

**Avalanche Hazard Designation Mapping  
Overview**

<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:12,500 800 400 0 800 Feet		
<b>FILE NO.</b> 19-0017-JUN-002	<b>Figure 2.3b</b>	
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ
<b>APVD</b> AJ	<b>REV</b> 2	<b>PROJECT NO.</b> 19-0017-JUN
<b>DATE</b> April 27, 2022		

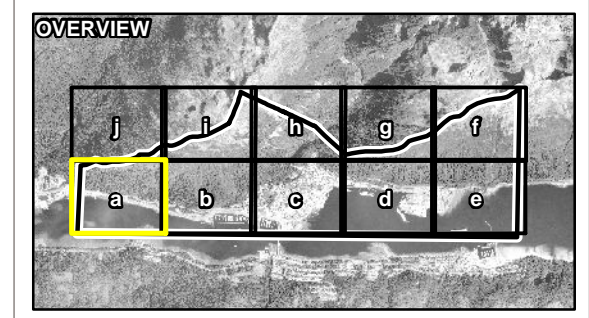
C:\Users\chris\Dropbox (D&C)\Terra Tech - Juneau - 19-0017-JUN\Maps\GIS Data\City of Juneau - FIG2-3 - Av Designation - Overview - 2022-04-27 by chris





**LEGEND**

- Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)
- Base Data**
  - Index Contour (100 ft)
  - Intermediate Contour (25 ft)
  - Land Parcel
- AVALANCHE HAZARD DESIGNATION**
  - Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
  - Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
  - Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).



**NOTES**  
 Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
 Base data source:  
 Land parcels provided by CBJ.  
 Contours generated from 2013 LiDAR provided by CBJ.  
 Background contours generated from 2012 LiDAR provided by CBJ.  
 Primary imagery provided by CBJ, 2013.  
 Background imagery provided by ESRI; Maxar (2020).

STATUS  
ISSUED FOR USE

**JUNEAU LANDSLIDE AND  
 AVALANCHE ASSESSMENT**

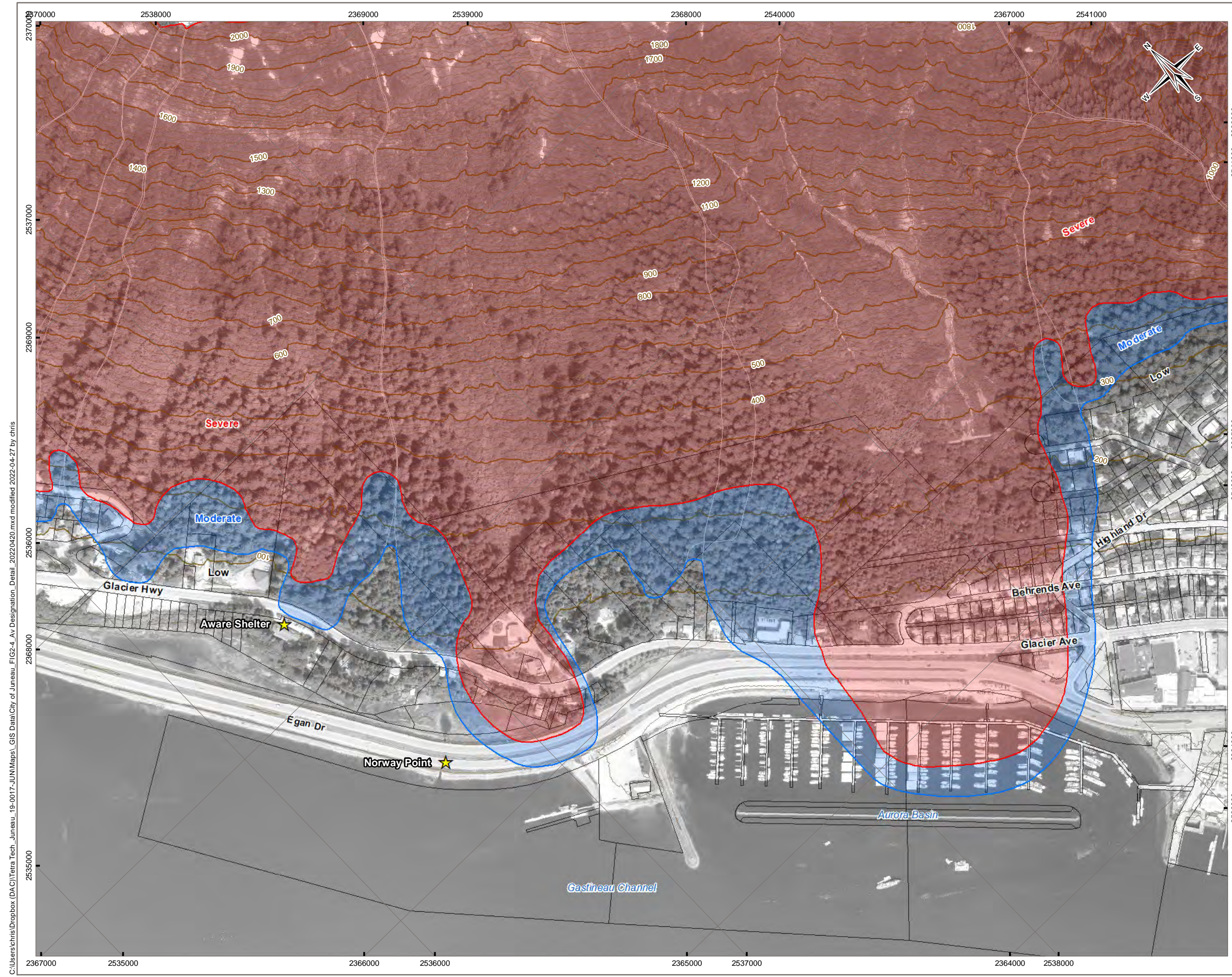
**Avalanche Hazard Designation Mapping  
 Detail**

<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:5,000 300 150 0 300 Feet		
<b>FILE NO.</b> 19-0017-JUN-002	<b>OFFICE</b> DAC-Rev	<b>DATE</b> April 27, 2022
<b>DWN</b> CA	<b>CKD</b> AJ	<b>APVD</b> AJ
<b>REV</b> 2	<b>PROJECT NO.</b> 19-0017-JUN	

**Figure 2.4a**

C:\Users\chris\Dropbox (D&C)\Terra Tech - Juneau - 19-0017-JUN\Maps\GIS Data\City of Juneau - FIG2-4 - Av Designation - Detail - 20220420.mxd modified 2022-04-27 by chris





**LEGEND**

- ★ Location of Interest
- ▭ Study Area
- ☁ Avalanche Path (estimated 300-year boundary)

**Base Data**

- Index Contour (100 ft)
- Intermediate Contour (25 ft)
- ▭ Land Parcel

**AVALANCHE HAZARD DESIGNATION**

**Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.

**Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).

**Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).

**OVERVIEW**

**NOTES**  
Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
Base data source:  
Land parcels provided by CBJ.  
Contours generated from 2013 LiDAR provided by CBJ.  
Background contours generated from 2012 LiDAR provided by CBJ.  
Primary imagery provided by CBJ, 2013.  
Background imagery provided by ESRI; Maxar (2020).

**STATUS**  
ISSUED FOR USE

**JUNEAU LANDSLIDE AND  
AVALANCHE ASSESSMENT**

**Avalanche Hazard Designation Mapping  
Detail**

<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> CITY AND BOROUGH OF <b>JUNEAU</b> ALASKA
Scale: 1:5,000 300 150 0 300 Feet		<b>DYNAMIC</b>
<b>FILE NO.</b> 19-0017-JUN-002	<b>Figure 2.4b</b>	
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ
<b>APVD</b> AJ	<b>REV</b> 2	
<b>DATE</b> April 27, 2022	<b>PROJECT NO.</b> 19-0017-JUN	

C:\Users\chris\Dropbox (D&C)\Terra Tech - Juneau - 19-0017-JUN\Maps\_GIS Data\City of Juneau\_FIG2-4\_Av Designation\_Detail\_20220420.mxd modified 2022-04-27 by chris

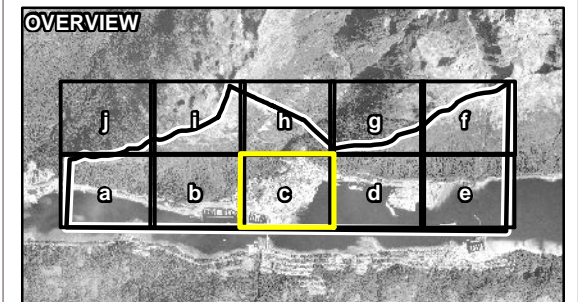




C:\Users\chris\Dropbox (DAC)\Terra Tech - Juneau - 19-0017-JUN\Maps - GIS Data\City of Juneau - FIG2-4 - Av Designation - Detail - 20220420.mxd modified 2022-04-27 by chris

### LEGEND

- Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)
- Base Data**
- Index Contour (100 ft)
- Intermediate Contour (25 ft)
- Land Parcel
- AVALANCHE HAZARD DESIGNATION**
- Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
- Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
- Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).



**NOTES**  
 Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
 Base data source:  
 Land parcels provided by CBJ.  
 Contours generated from 2013 LiDAR provided by CBJ.  
 Background contours generated from 2012 LiDAR provided by CBJ.  
 Primary imagery provided by CBJ, 2013.  
 Background imagery provided by ESRI; Maxar (2020).

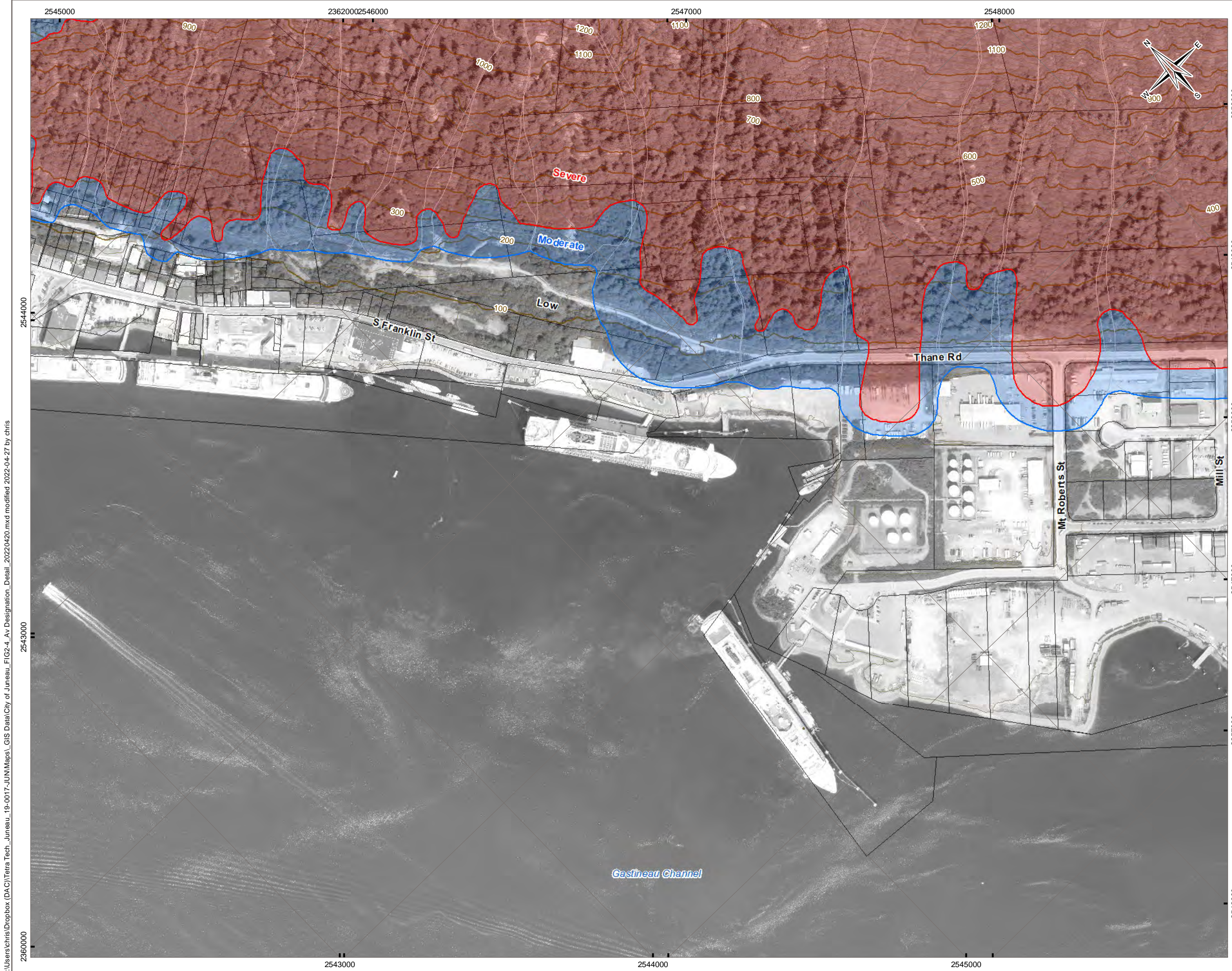
STATUS  
ISSUED FOR USE

## JUNEAU LANDSLIDE AND AVALANCHE ASSESSMENT

### Avalanche Hazard Designation Mapping Detail

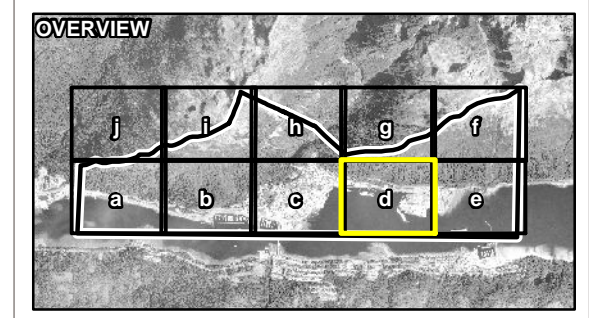
<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 			
Scale: 1:5,000 					
<b>FILE NO.</b> 19-0017-JUN-002		<b>Figure 2.4c</b>			
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA		<b>CKD</b> AJ	<b>APVD</b> AJ	<b>REV</b> 2
<b>DATE</b> April 27, 2022	<b>PROJECT NO.</b> 19-0017-JUN				





**LEGEND**

- Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)
- Base Data**
- Index Contour (100 ft)
- Intermediate Contour (25 ft)
- Land Parcel
- AVALANCHE HAZARD DESIGNATION**
- Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
- Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
- Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).



**NOTES**  
 Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
 Base data source:  
 Land parcels provided by CBJ.  
 Contours generated from 2013 LiDAR provided by CBJ.  
 Background contours generated from 2012 LiDAR provided by CBJ.  
 Primary imagery provided by CBJ, 2013.  
 Background imagery provided by ESRI; Maxar (2020).

STATUS  
ISSUED FOR USE

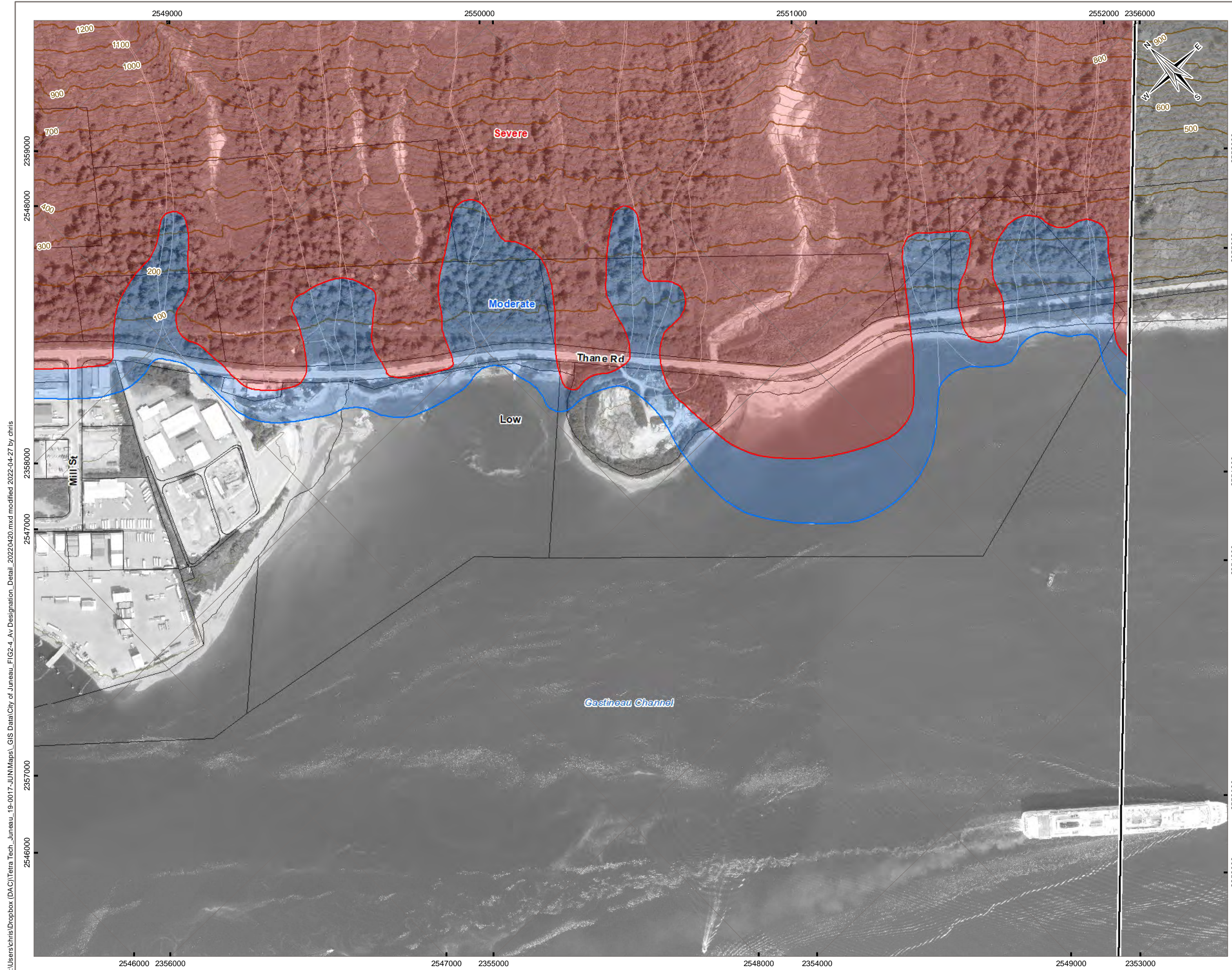
**JUNEAU LANDSLIDE AND  
 AVALANCHE ASSESSMENT**

**Avalanche Hazard Designation Mapping  
 Detail**

<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:5,000 300 150 0 300 Feet		
<b>FILE NO.</b> 19-0017-JUN-002	<b>Figure 2.4d</b>	
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ
<b>APVD</b> AJ	<b>REV</b> 2	<b>PROJECT NO.</b> 19-0017-JUN
<b>DATE</b> April 27, 2022		

C:\Users\chris\Dropbox (D&C)\Terra Tech - Juneau - 19-0017-JUN\Maps\GIS Data\City of Juneau\_FIG2-4\_Av Designation\_Detail\_20220420.mxd modified 2022-04-27 by chris





C:\Users\chris\Dropbox (D&C)\Terra Tech - Juneau - 19-0017-JUN\Maps\CIS Data\CIS Data City of Juneau - FIG2-4 - Av Designation - Detail - 20220420.mxd modified 2022-04-27 by chris

### LEGEND

- ★ Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)

**Base Data**

- Index Contour (100 ft)
- Intermediate Contour (25 ft)
- Land Parcel

**AVALANCHE HAZARD DESIGNATION**

- Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
- Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
- Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).

**OVERVIEW**

**NOTES**

Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".

Base data source:  
Land parcels provided by CBJ.  
Contours generated from 2013 LiDAR provided by CBJ.  
Background contours generated from 2012 LiDAR provided by CBJ.  
Primary imagery provided by CBJ, 2013.  
Background imagery provided by ESRI; Maxar (2020).

STATUS  
ISSUED FOR USE

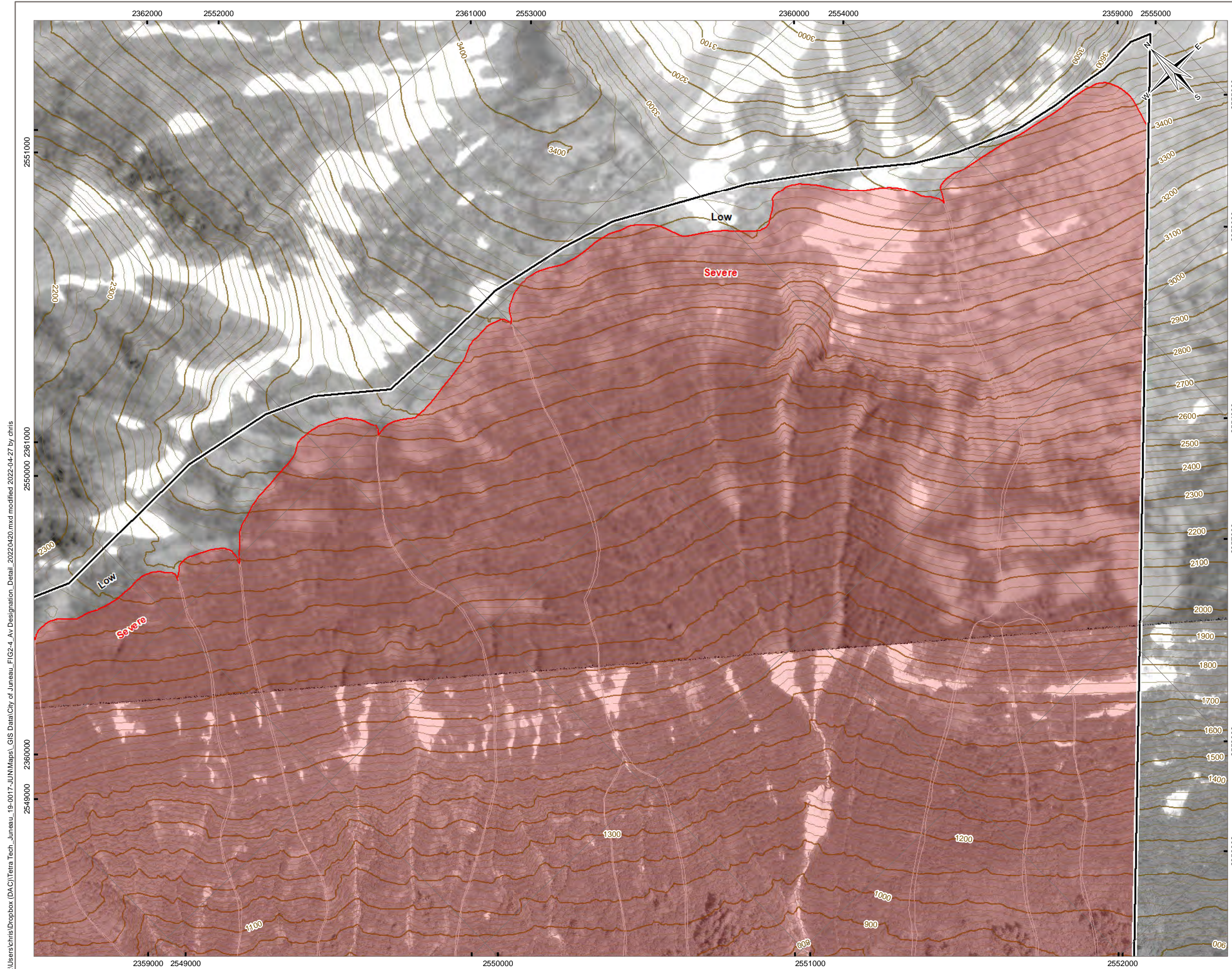
## JUNEAU LANDSLIDE AND AVALANCHE ASSESSMENT

Avalanche Hazard Designation Mapping  
Detail

<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:5,000 		
<b>FILE NO.</b> 19-0017-JUN-002		
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ
<b>APVD</b> AJ	<b>REV</b> 2	
<b>DATE</b> April 27, 2022	<b>PROJECT NO.</b> 19-0017-JUN	

Figure 2.4e





**LEGEND**

- ★ Location of Interest
- ▭ Study Area
- ☁ Avalanche Path (estimated 300-year boundary)

**Base Data**

- 📏 Index Contour (100 ft)
- 📏 Intermediate Contour (25 ft)
- 📐 Land Parcel

**AVALANCHE HAZARD DESIGNATION**

**Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.

**Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).

**Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).

**OVERVIEW**

**NOTES**  
Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
Base data source:  
Land parcels provided by CBJ.  
Contours generated from 2013 LiDAR provided by CBJ.  
Background contours generated from 2012 LiDAR provided by CBJ.  
Primary imagery provided by CBJ, 2013.  
Background imagery provided by ESRI; Maxar (2020).

**STATUS**  
ISSUED FOR USE

**JUNEAU LANDSLIDE AND  
AVALANCHE ASSESSMENT**

**Avalanche Hazard Designation Mapping  
Detail**

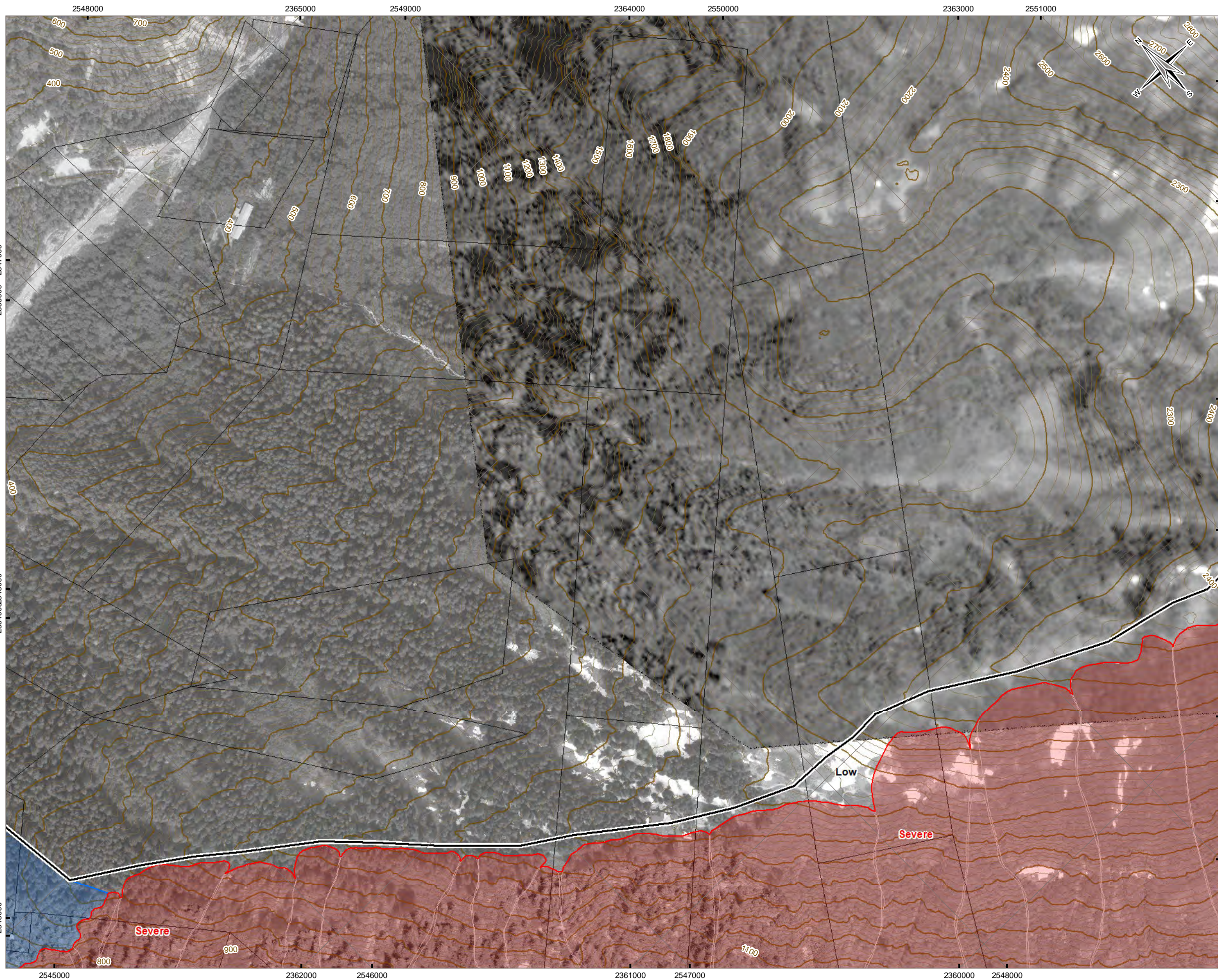
<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:5,000 300 150 0 300 Feet		
<b>FILE NO.</b> 19-0017-JUN-002	<b>OFFICE</b> DAC-Rev	<b>DATE</b> April 27, 2022
<b>DWN</b> CA	<b>CKD</b> AJ	<b>APVD</b> AJ
<b>REV</b> 2	<b>PROJECT NO.</b> 19-0017-JUN	

**Figure 2.4f**

C:\Users\chris\Dropbox (D&C)\Terra Tech - Juneau - 19-0017-JUN\Maps - GIS Data\City of Juneau - FIG2-f - Av Designation - Detail - 20220420.mxd modified 2022-04-27 by chris

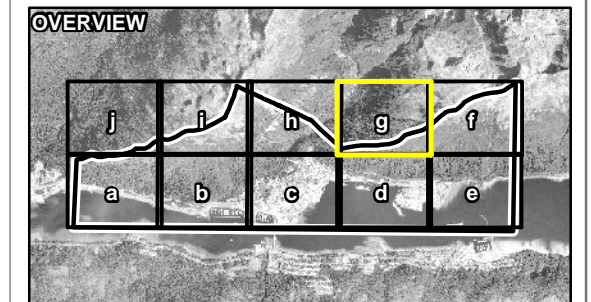


C:\Users\chris\Dropbox (D:\C)\Terra Tech - Juneau - 19-0017-JUN\Maps\GIS Data\City of Juneau - FIG2-4 - Av Designation - Detail - 20220420.mxd modified 2022-04-27 by chris



**LEGEND**

- Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)
- Base Data**
  - Index Contour (100 ft)
  - Intermediate Contour (25 ft)
  - Land Parcel
- AVALANCHE HAZARD DESIGNATION**
  - Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
  - Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
  - Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).



**NOTES**  
 Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
 Base data source:  
 Land parcels provided by CBJ.  
 Contours generated from 2013 LiDAR provided by CBJ.  
 Background contours generated from 2012 LiDAR provided by CBJ.  
 Primary imagery provided by CBJ, 2013.  
 Background imagery provided by ESRI; Maxar (2020).

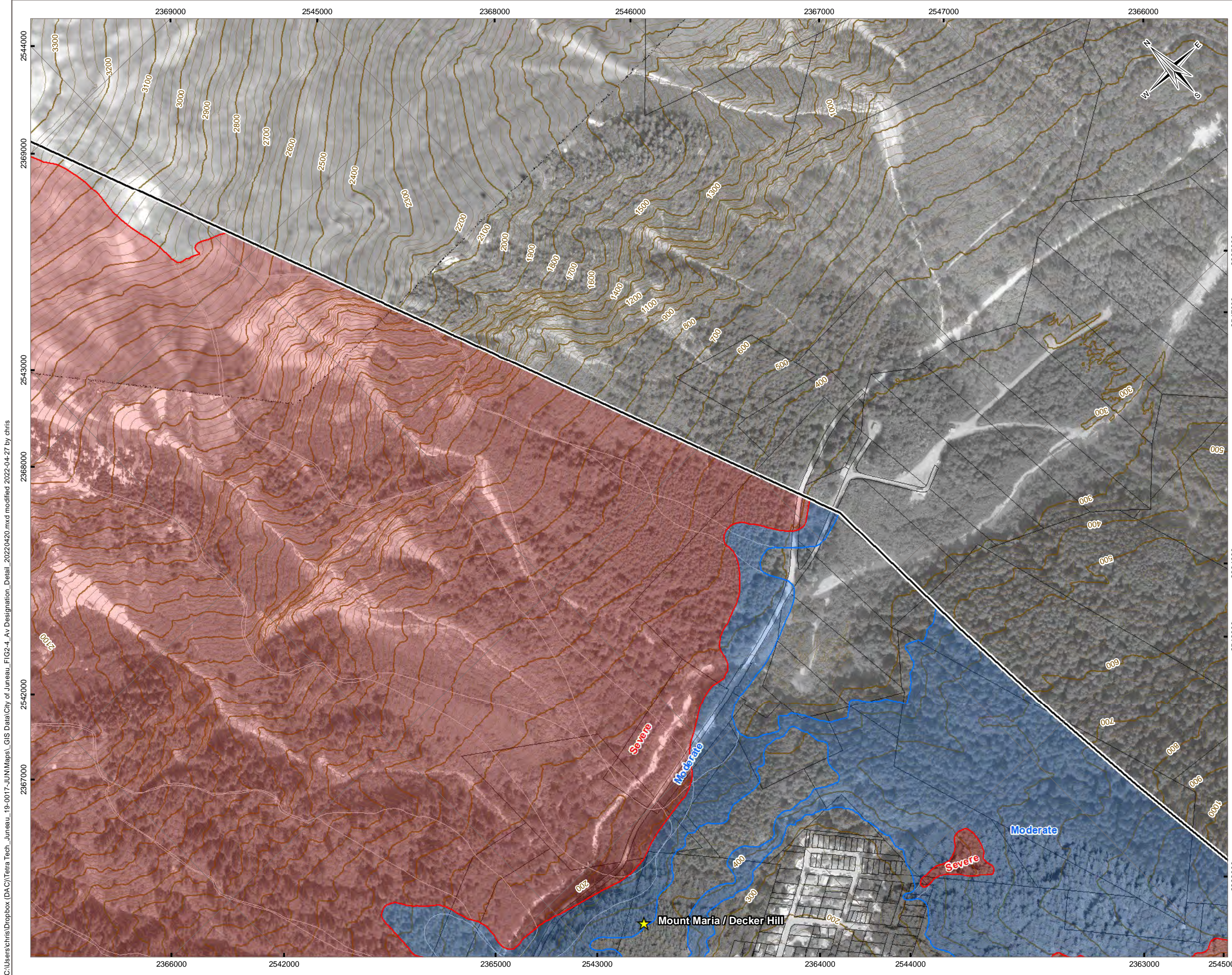
STATUS  
ISSUED FOR USE

**JUNEAU LANDSLIDE AND AVALANCHE ASSESSMENT**

**Avalanche Hazard Designation Mapping Detail**

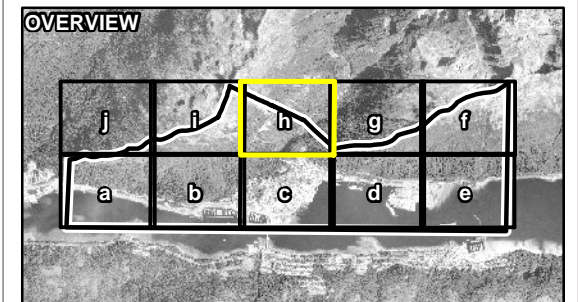
<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:5,000 300 150 0 300 Feet		
<b>FILE NO.</b> 19-0017-JUN-002	<b>Figure 2.4g</b>	
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ
<b>APVD</b> AJ	<b>REV</b> 2	<b>PROJECT NO.</b> 19-0017-JUN
<b>DATE</b> April 27, 2022		





**LEGEND**

- Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)
- Base Data**
- Index Contour (100 ft)
- Intermediate Contour (25 ft)
- Land Parcel
- AVALANCHE HAZARD DESIGNATION**
- Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
- Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
- Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).



**NOTES**  
 Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
 Base data source:  
 Land parcels provided by CBJ.  
 Contours generated from 2013 LiDAR provided by CBJ.  
 Background contours generated from 2012 LiDAR provided by CBJ.  
 Primary imagery provided by CBJ, 2013.  
 Background imagery provided by ESRI; Maxar (2020).

STATUS  
ISSUED FOR USE

**JUNEAU LANDSLIDE AND  
 AVALANCHE ASSESSMENT**

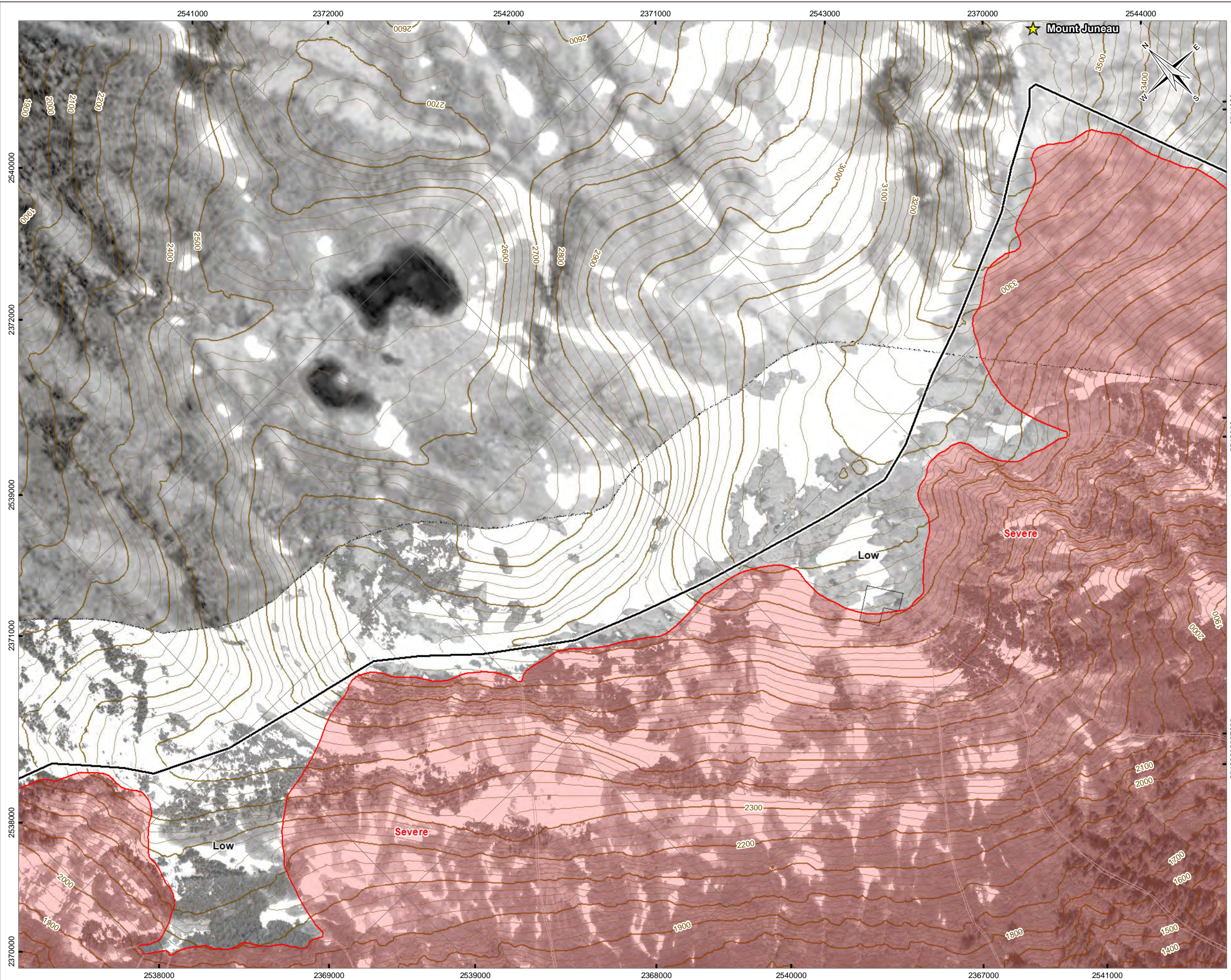
**Avalanche Hazard Designation Mapping  
 Detail**

<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:5,000 		
<b>FILE NO.</b> 19-0017-JUN-002	<b>Figure 2.4h</b>	
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ
<b>DATE</b> April 27, 2022	<b>APVD</b> AJ	<b>REV</b> 2
<b>PROJECT NO.</b> 19-0017-JUN		

C:\Users\chris\Dropbox (D&C)\Terra Tech - Juneau - 19-0017-JUN\Maps\CIS Data\City of Juneau\_FIG2-4\_Av Designation\_Detail\_20220420.mxd modified 2022-04-27 by chris



C:\Users\chris\Dropbox (DAC)\Terra Tech - Juneau - 19-0017-JUN\Maps\GIS Data\City of Juneau\_FIG2-4\_Av Designation\_Detail\_20220420.mxd modified 2022-04-27 by chris



### LEGEND

- ★ Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)

**Base Data**

- Index Contour (100 ft)
- Intermediate Contour (25 ft)
- Land Parcel

**AVALANCHE HAZARD DESIGNATION**

- Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
- Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
- Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).

**OVERVIEW**

**NOTES**  
 Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".  
 Base data source:  
 Land parcels provided by CBJ.  
 Contours generated from 2013 LiDAR provided by CBJ.  
 Background contours generated from 2012 LiDAR provided by CBJ.  
 Primary imagery provided by CBJ, 2013.  
 Background imagery provided by ESRI; Maxar (2020).

STATUS  
ISSUED FOR USE

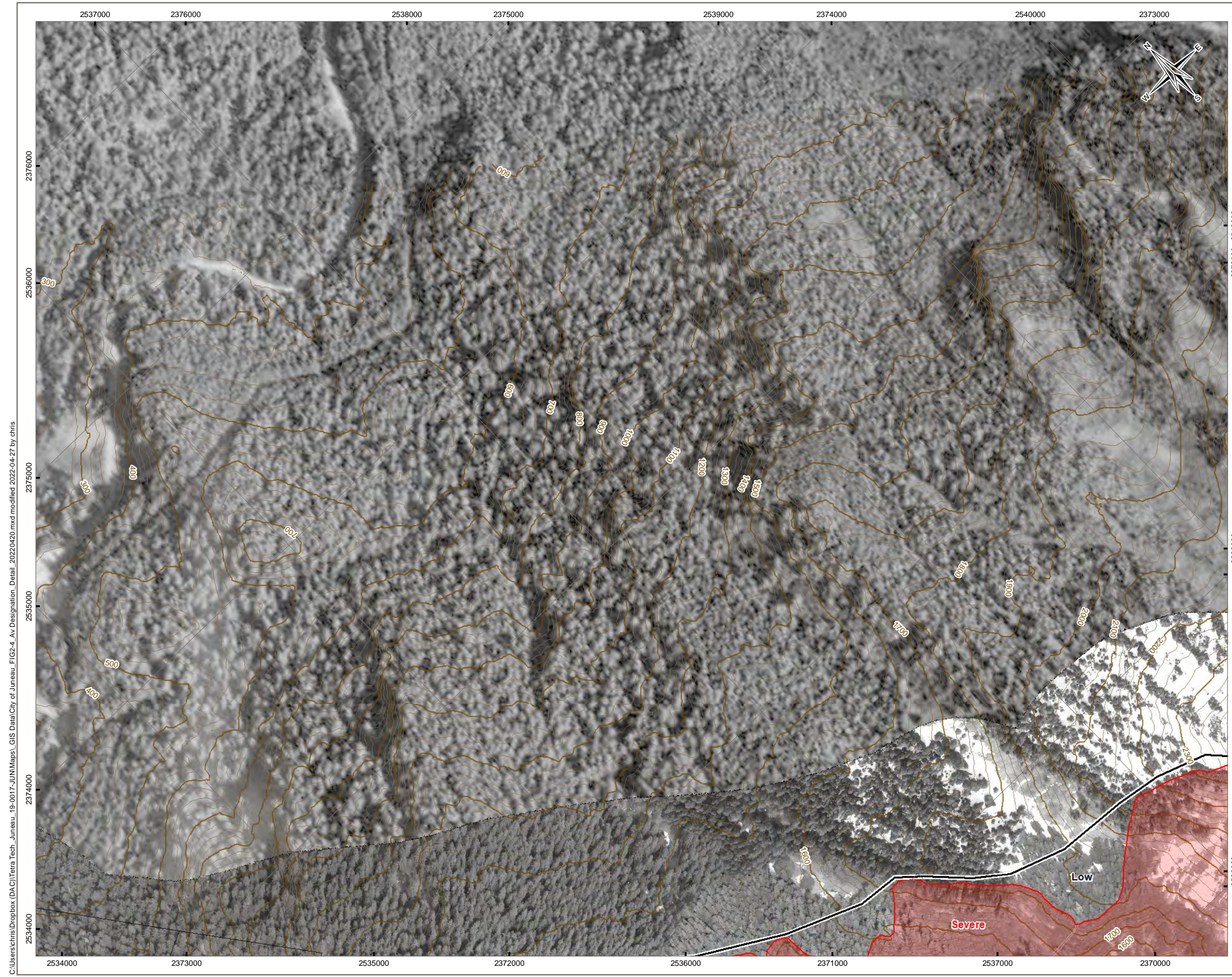
## JUNEAU LANDSLIDE AND AVALANCHE ASSESSMENT

**Avalanche Hazard Designation Mapping  
Detail**

<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:5,000 300 150 0 300 Feet		
<b>FILE NO.</b> 19-0017-JUN-002		
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ
	<b>APVD</b> AJ	<b>REV</b> 2
<b>DATE</b> April 27, 2022	<b>PROJECT NO.</b> 19-0017-JUN	

**Figure 2.4i**





C:\Users\chris\Dropbox (DAC)\Terra Tech - Juneau - 19-0017-JUN\Maps\GIS Data\City of Juneau\_FIG2-4\_Av Designation\_Detail\_20220420.mxd modified 2022-04-27 by chris

**LEGEND**

- ★ Location of Interest
- Study Area
- Avalanche Path (estimated 300-year boundary)

**Base Data**

- Index Contour (100 ft)
- Intermediate Contour (25 ft)
- Land Parcel

**AVALANCHE HAZARD DESIGNATION**

- Low**  
Return period greater than 300 years  
OR  
Impact pressures less than 20 lbs/ft<sup>2</sup> (1 kPa) with a return period greater than 30 years.
- Moderate**  
Return period between 30 and 300 years;  
AND  
Impact pressure less than 600 lbs/ft<sup>2</sup> (30 kPa).
- Severe**  
Return period less than 30 years;  
AND/OR  
Impact pressure greater than or equal to 600 lbs/ft<sup>2</sup> (30 kPa).

**OVERVIEW**

**NOTES**

Low hazard designation not shown. Low hazard designation includes all areas not designated as "Moderate" or "Severe".

Base data source:  
Land parcels provided by CBJ.  
Contours generated from 2013 LiDAR provided by CBJ.  
Background contours generated from 2012 LiDAR provided by CBJ.  
Primary imagery provided by CBJ, 2013.  
Background imagery provided by ESRI; Maxar (2020).

STATUS  
ISSUED FOR USE

**JUNEAU LANDSLIDE AND AVALANCHE ASSESSMENT**

**Avalanche Hazard Designation Mapping Detail**

<b>PROJECTION</b> State Plane Alaska Zone 1 5001	<b>DATUM</b> NAD83	<b>CLIENT</b> 
Scale: 1:5,000 		
<b>FILE NO.</b> 19-0017-JUN-002		
<b>OFFICE</b> DAC-Rev	<b>DWN</b> CA	<b>CKD</b> AJ
<b>APVD</b> AJ	<b>REV</b> 2	
<b>DATE</b> April 27, 2022	<b>PROJECT NO.</b> 19-0017-JUN	

Figure 2.4j