This document is meant to be used in conjunction with the BEAM label creation guideline, which describes the process to follow for creating and saving polygon labels. This document serves to highlight best practice for label creation, and aims to provide a consistent set of rules to follow when creating training data for the BEAM model.

**Overview**

Generating accurate labels is important for the quality of the BEAM model and its performance.

The aim when generating labels is to capture the entirety of each structure’s rooftop using as few vertices as possible. The key point is to cover the entirety of the structure within one or two pixels of accuracy.

In some instances, this is straightforward, and the most important consideration is simply tracing the rooftop of each structure accurately:

|  |  |
| --- | --- |
| A house with cars parked in the yard  Description automatically generated with medium confidence | A house with cars parked in the yard  Description automatically generated |
| Correct | Incorrect |

However, in other cases, particularly in complex scenes or areas with high levels of informality, it is not always clear where one building starts and another one stops, or what the true shape of a building is if it is covered by overhanging trees or shadows. In these situations, it is essential that:

* Polygons for buildings that are close together do not overlap

|  |  |
| --- | --- |
|  |  |
| Correct | Incorrect |

* Building shapes are not compromised by the presence of trees or shadows (this can mean inferring the shape of a building)

|  |  |
| --- | --- |
|  | A bird's eye view of a rooftop  Description automatically generated |
| Correct | Incorrect |

* Every effort is taken to ensure that individual structures are correctly discerned. This can mean cross-referencing different sources of imagery or closely inspecting structures to discern where gaps or shadows are visible. Particularly in informal settings, this can be confusing as large structures are often built from several different types of roofing material. In this situation, it is important that the structure is captured as a single polygon.

|  |  |
| --- | --- |
|  | A group of squares with red squares  Description automatically generated |
| Correct | Incorrect |

Finally, labels should accurately capture building shapes without being overly prescriptive about jutting facades and other irregularities that will complicate polygons and increase the number of vertices used:

|  |  |
| --- | --- |
|  |  |
| Correct | Incorrect |

* Avoid modifying the labels to accommodate shadows, trees, or other image-dependent features.
* Label only the visible rooftops of buildings in off-nadir imagery, and avoid capturing building facades, windows, garages, etc.
* Use additional image sources for added context and detail, but avoid using outdated or inaccurate basemaps to infer anything that is not visible on the image tile.
* Introduction
  + Explain the purpose and scope of the document
  + Provide an overview of the ramp project and its objectives
  + Define the key terms related to building footprint extraction and data labeling
* General Guidance
  + Describe the expected format and quality of building polygon labels
  + Provide examples and tips for labeling buildings correctly and consistently
  + [Explain how to handle shadows, trees, and other image-dependent features](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C0%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22shadows%2C%20t...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A3%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A4%2C%22highlightText%22%3A%22shadows%2C%20trees%2C%20or%20other%20image%5Cu0002dependent%20features.%22%2C%22snippets%22%3A%5B%5D%7D%7D)[1](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C0%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22shadows%2C%20t...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A3%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A4%2C%22highlightText%22%3A%22shadows%2C%20trees%2C%20or%20other%20image%5Cu0002dependent%20features.%22%2C%22snippets%22%3A%5B%5D%7D%7D)
* [Working with Off-Nadir Imagery](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C1%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22Working%20wi...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A1%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A20%2C%22highlightText%22%3A%22Working%20with%20Off-Nadir%20Imagery%22%2C%22snippets%22%3A%5B%5D%7D%7D)[2](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C1%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22Working%20wi...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A1%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A20%2C%22highlightText%22%3A%22Working%20with%20Off-Nadir%20Imagery%22%2C%22snippets%22%3A%5B%5D%7D%7D)[3](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C2%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22working%20wi...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A2%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A19%2C%22highlightText%22%3A%22working%20with%20off-nadir%20imagery%2C%20which%22%2C%22snippets%22%3A%5B%5D%7D%7D)
  + [Define what off-nadir imagery is and how it affects the positional accuracy and visibility of building features](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C3%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22Off-nadir%20...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A3%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A28%2C%22highlightText%22%3A%22Off-nadir%20imagery%20effects%20the%20positional%20%5Cr%5Cnaccuracy%20of%20collected%20features%2C%20meaning%20that%20the%20polygon%20collected%20over%20the%20%5Cr%5Cnrooftop%20of%20a%20building%20will%20be%20shifted%20from%20the%20true%20building%20footprint.%22%2C%22snippets%22%3A%5B%5D%7D%7D)[4](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C3%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22Off-nadir%20...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A3%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A28%2C%22highlightText%22%3A%22Off-nadir%20imagery%20effects%20the%20positional%20%5Cr%5Cnaccuracy%20of%20collected%20features%2C%20meaning%20that%20the%20polygon%20collected%20over%20the%20%5Cr%5Cnrooftop%20of%20a%20building%20will%20be%20shifted%20from%20the%20true%20building%20footprint.%22%2C%22snippets%22%3A%5B%5D%7D%7D)
  + Provide examples and tips for labeling buildings in off-nadir imagery
  + Explain how to avoid capturing building facades, windows, garages, etc.
* Guidance for Complex Scenes
  + Describe the challenges and best practices for labeling buildings in dense urban scenes, informal settlements, impermanent structures, courtyards, rooftop garages, etc.
  + Provide examples and tips for using additional image sources for added context and detail
  + [Explain how to avoid using outdated or inaccurate basemaps to infer anything that is not visible on the image tile](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C4%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22Do%20not%20use...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A5%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A11%2C%22highlightText%22%3A%22Do%20not%20use%20a%20basemap%20to%20infer%20anything%20that%20the%20%5Cr%5Cnlabeler%20is%20unable%20to%20see%20on%20the%20image%20tile%2C%20but%20instead%20use%20that%20other%20imagery%20to%20%5Cr%5Cnconfirm%20what%20they%20suspected%20was%2Fwas%20not%20there.%22%2C%22snippets%22%3A%5B%5D%7D%7D)[5](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C4%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22Do%20not%20use...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A5%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A11%2C%22highlightText%22%3A%22Do%20not%20use%20a%20basemap%20to%20infer%20anything%20that%20the%20%5Cr%5Cnlabeler%20is%20unable%20to%20see%20on%20the%20image%20tile%2C%20but%20instead%20use%20that%20other%20imagery%20to%20%5Cr%5Cnconfirm%20what%20they%20suspected%20was%2Fwas%20not%20there.%22%2C%22snippets%22%3A%5B%5D%7D%7D)
* Common Errors
  + Identify and explain the most common errors in label creation, such as fields captured as buildings, missed buildings, incomplete labels, shadows, overlapping polygons, etc.
  + Provide examples and tips for avoiding or correcting these errors
* Label Quality Review
  + [Describe the quality assurance process for assessing whether individual image tiles follow the label guidance and will be of value to the model](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C5%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22This%20guida...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A9%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A2%2C%22highlightText%22%3A%22This%20guidance%20is%20useful%20in%20the%20quality%20assurance%20stage%20of%20the%20training%20data%20process%20%5Cr%5Cnto%20assess%20whether%20individual%20256%20x%20256%20pixel%20tiles%20follow%20the%20label%20guidance%20and%20will%20%5Cr%5Cnbe%20of%20value%20to%20the%20model.%22%2C%22snippets%22%3A%5B%5D%7D%7D)[6](https://edgeservices.bing.com/edgesvc/chat?udsframed=1&form=SHORUN&clientscopes=chat,noheader,udsedgeshop,channelstable,&shellsig=5e609f9e1dec037f7f7cbaa98e4f99ef6f050fce&setlang=en-US&lightschemeovr=1#sjevt%7CDiscover.Chat.SydneyClickPageCitation%7Cadpclick%7C5%7Cfc28ece5-a217-4bc9-afc8-6825f92b5d17%7C%7B%22sourceAttributions%22%3A%7B%22providerDisplayName%22%3A%22This%20guida...%22%2C%22pageType%22%3A%22pdf%22%2C%22pageIndex%22%3A9%2C%22relatedPageUrl%22%3A%22https%253A%252F%252Frampml.global%252Fwp-content%252Fuploads%252F2022%252F05%252FOfficial_ramp_Labelling_Guidelines.pdf%22%2C%22lineIndex%22%3A2%2C%22highlightText%22%3A%22This%20guidance%20is%20useful%20in%20the%20quality%20assurance%20stage%20of%20the%20training%20data%20process%20%5Cr%5Cnto%20assess%20whether%20individual%20256%20x%20256%20pixel%20tiles%20follow%20the%20label%20guidance%20and%20will%20%5Cr%5Cnbe%20of%20value%20to%20the%20model.%22%2C%22snippets%22%3A%5B%5D%7D%7D)
  + Provide a decision tree and examples of acceptable and unacceptable tiles
* Conclusion
  + Summarize the main points and recommendations of the document
  + Emphasize the importance of high-quality training data for the ramp model
  + Provide contact information for feedback and questions