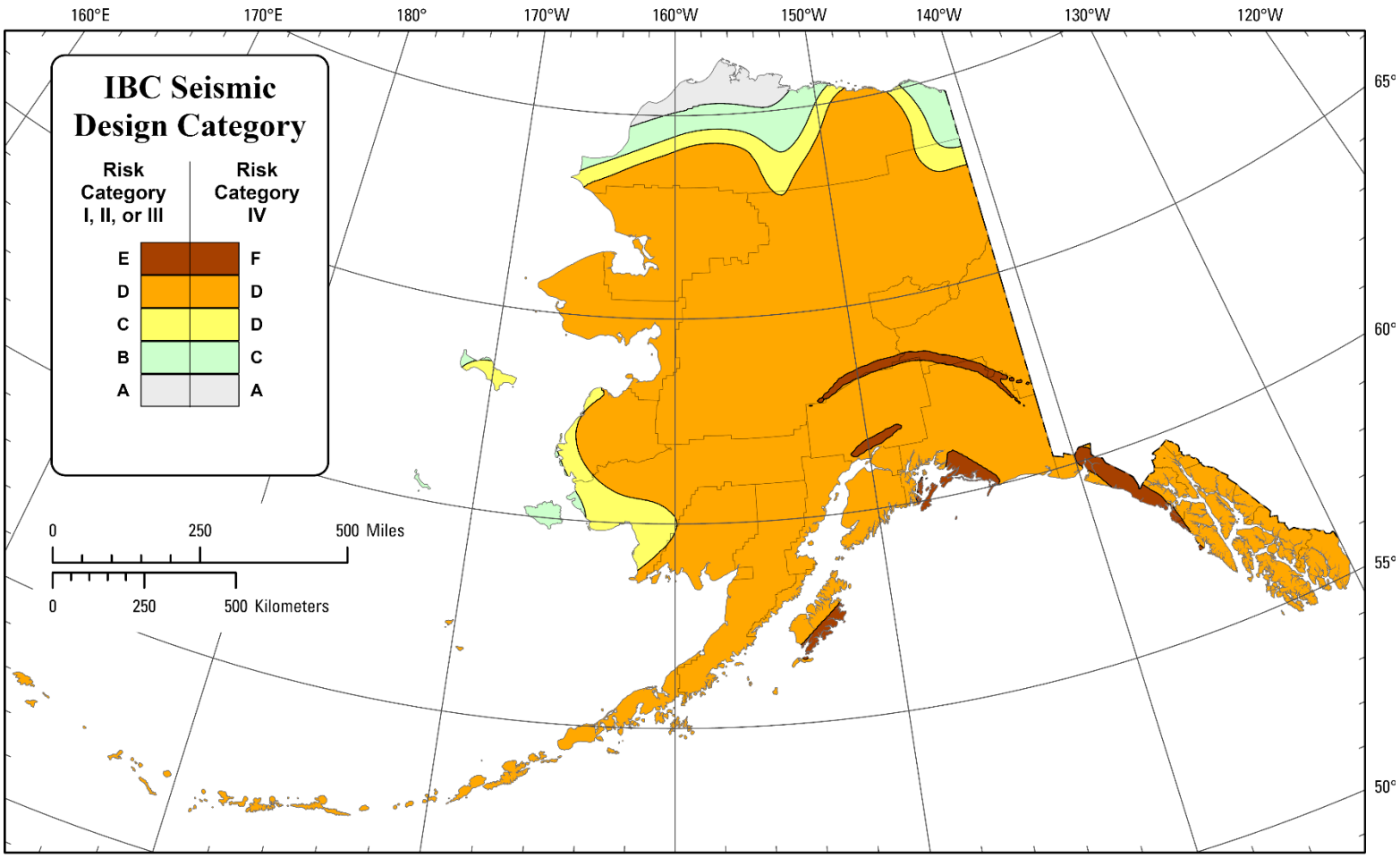

Introduction to 2024 Edition Seismic Design Category Maps

July 2024

FEMA

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Introduction to 2024 Edition Seismic Design Category Maps

1. Acronym List

ASCE	American Society of Civil Engineers
BSSC	Building Seismic Safety Council
FEMA	Federal Emergency Management Agency
IBC	International Building Code
ICC	International Code Council
IRC	International Residential Code
NEHRP	National Earthquake Hazards Reduction Program
NSHM	National Seismic Hazard Models
USGS	U.S. Geological Survey
SDC	Seismic Design Category
SEI	Structural Engineering Institute

2. Introduction to Seismic Design Category Maps

2.1. Purpose of Brochure

This brochure introduces the 2024 editions of seismic design maps developed under the National Earthquake Hazards Reduction Program (NEHRP) and published in the International Residential Code (IRC) and International Building Code (IBC). The intended audiences include the general public, earthquake program managers, building officials, and designers using the IRC and IBC. New in the 2024 edition of the IBC are Seismic Design Category (SDC) maps, designating SDC based on a conservative assignment of default site conditions (Site Class), applicable for most building sites.

2.2. What the Maps Illustrate

These seismic design maps illustrate the varying earthquake demands considered in design of buildings and other structures across the U.S. states and territories. The seismic design maps are

also useful for general earthquake hazard information and to inform earthquake risk reduction projects.

The earthquake demands are mapped by SDCs that vary from SDC A, representing the lowest hazard with little to no anticipated damage due to earthquakes, to SDCs E and F, representing very high hazard and the possibility of significant earthquake damage, even to robust structures. The concept of the SDC integrates several key factors that influence seismic performance of structures including potential earthquake ground motions, site soil amplification of ground motions, structure size and configuration, and structure occupancy and use. These factors can significantly influence potential structure performance and impact to occupants in an earthquake.

The SDCs are depicted on the maps with contours and varying colors. For the IRC maps, the SDCs are also associated with varying levels of design spectral response acceleration S_{DS} that indicate the intensity of shaking that might be experienced by the structure during a code-defined design-level earthquake.

2.3. Where the Maps Come From

The SDC maps are developed as a collaboration of the NEHRP Provisions Update Committee and the U.S. Geological Survey (USGS). The 2024 edition IRC and IBC maps are based on the USGS's National Seismic Hazard Models (NSHMs), the site-specific ground motion procedures of the 2020 NEHRP Recommended Provisions (FEMA, 2020a), ASCE/SEI 7-22 (ASCE, 2021), and the IRC and IBC definitions of SDC. The updates to the SDC maps incorporate (1) recommendations of the Project 17 collaboration between the Building Seismic Safety Council (BSSC) and the USGS (BSSC, 2019), and (2) the 2018 update of the USGS NSHM for the conterminous U.S. This is consistent with the map updates already adopted by the 2020 NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-2082) and ASCE/SEI 7-22. More detailed discussion is provided later in this brochure.

2.4. Map Use in the IRC and IBC

The IRC is developed by the International Code Council (ICC) as a national model code for design of one- and two-family detached dwellings and townhouses up to three stories in height. The IRC is adopted by many states, territories, and local governments, forming the basis of many local residential codes. The IRC SDC maps are developed using the same seismic hazard data as the IBC maps but are modified for best applicability to the low-rise residential building stock and the prescriptive design methods of the IRC. For this reason, the IRC SDC maps are not interchangeable with the IBC SDC maps.

The IBC is developed by the ICC as a national model code for design of buildings and other structures, other than the residential structures that are addressed by the IRC. The IBC is adopted by many states, territories, and local governments, forming the basis of many local building codes. The IBC SDC maps are developed using the same seismic hazard data as the IRC maps but addresses

the wider building stock and engineered design methods of the IBC. For this reason, the IBC SDC maps are not interchangeable with the IRC SDC maps.

2.5. Other Uses of the Maps

These maps are used in a variety of earthquake risk reduction programs at federal, state, local, and territorial levels. For example, FEMA National Earthquake Hazards Reduction Program (NEHRP) uses the maps to determine high seismic hazard states and territories eligible for Individual State Assistance Grant Programs.

3. 2024 International Residential Code Seismic Design Category Maps

The IRC is a national model code for design of one- and two-family detached dwellings and townhouses up to three stories in height. The IRC forms the basis of many locally adopted residential codes in the U.S. states and territories. The IRC maps assign SDCs ranging from A to E (but not F), because the applicable residential buildings are assigned to Risk Category II. SDC A represents the lowest hazard with little to no anticipated damage due to earthquakes, while SDC E represents very high hazard and the possibility of significant earthquake damage, even to robust buildings. The IRC is a prescriptive code with pre-engineered design solutions that are presented in the form of text and tables. It is intended that dwellings and townhouses can be designed per the IRC without the use of engineered design. The user looks up seismic design requirements (for example, the length of required seismic bracing in walls) from tables based on SDC. Because of this pre-engineered design, the IRC maps include more SDCs than do the IBC maps, breaking SDC D in the IBC into SDCs D0, D1 and D2 in the IRC. This allows smaller incremental steps in the pre-engineered design requirements and is one of several differences between IRC and IBC maps. The 2024 IRC SDC maps are shown in Figure 1 to Figure 6.

3.1. What Has Been Updated

- The most current hazard data and design map procedures have been incorporated: USGS's National Seismic Hazard Models (NSHMs) and the site-specific ground motion procedures of the 2020 NEHRP Recommended Provisions.

- In the 2024 update, the two sets of maps previously included in the 2018 and 2021 IRC editions have been reduced to a single 2024 edition map set.

3.2. Where the Maps Can Be Used

The site soils can have a significant impact on the earthquake demands on buildings, with buildings on soft soils often seeing increased demands.

- The IRC SDC maps can be used for the majority of dwelling sites because they reflect seismic hazard for the most critical of standard site soil conditions (Site Class C, CD, D).

- The IRC SDC maps cannot be used for poor soil sites as discussed in IRC Section R401. Per IRC Section R401, the already required geotechnical study is required to include determination of S_{DS} for purposes of seismic design, from which IRC Table R301.2.2.1.1 can be used to assign SDC.

3.3. How to Use the IRC Maps

- The 2024 IRC maps can be found in print and pdf in several publications including the 2024 IRC and FEMA P-2192-4. The state and county lines on these maps provide adequate detail for assignment of the SDC in some but not all locations.

- When more detailed information on the IRC SDC is needed, as referenced in the 2024 IRC maps, USGS guidance on available tools can be found at: https://doi.org/10.5066/F7NK3C76. This link provides guidance on determination of SDC. The following is a step-wise explanation:

Steps to determine SDC as assigned by the IRC SDC maps (incorporates default Site Class):

- Go to the ASCE Hazard Tool site: https://ascehazardtool.org/ ,
- Enter property address,
- Standard Version: Select ASCE 7-22,
- Risk Category: Select Risk Category II,
- Site Soil Class: Select Default,
- From results (summary, detailed, or full report), determine spectral response acceleration at short periods S_{Ds} value, and
- Using the S_{DS} value, select the appropriate SDC per IRC Table R301.2.2.1.1. DO NOT USE the SDC assigned by the ASCE Hazard Tool, as it is an IBC SDC, and may not be correct for IRC use.

3.4. Differences Between IRC and IBC Maps.

The IRC SDC maps differ from the similar IBC maps in several important aspects. As previously mentioned, the IRC SDC maps are developed using the same seismic hazard data as the IBC maps but are modified for best applicability to the low-rise residential building stock and the prescriptive design methods of the IRC. The IRC is only applicable to low-rise dwelling construction, up to three stories. Because of this, the maps assume that dwelling seismic demands are controlled by short-period (stiff building) behavior, with mapping based on only the short-period design spectral response acceleration parameter, S_{DS}. This ignores the one- second parameter, SD1, which is considered in the IBC. In addition, the IRC maps assign SDC E where design response spectral acceleration, S_{DS}, exceeds 1.25g, a different trigger than the IBC maps. SDC E or F in the IBC is instead triggered by an S1 value of 0.75 or greater, which is independent of Site Class. As previously mentioned, the IRC SDC maps also subdivide IBC SDC D into IRC SDCs D0, D1 and D2. For these reasons the IRC maps should not be used where the IBC maps are required.

3.5. Permitted use of the IBC for IRC Designs

As an alternative to the IRC SDC maps, the IRC allows use of the IBC and ASCE/SEI 7 to determine SDC, should the user select to do so. In this method, the user determines the short-period spectral response acceleration S_{DS} using the IBC and ASCE 7, and then uses IRC Table R301.2.2.1.1 to determine the SDC. Because the IRC maps incorporate Site Classes C, CD, and D, it is possible for the IRC maps to assign a higher SDC than would be assigned using S_{DS} per the IBC and ASCE 7, particularly where Site Classes A through BC can be assigned.

Steps to determine SDC for IRC design using the IBC and ASCE 7 (where specific Site Class is assigned):

- Determine Site (soil) Class at site from site-specific geotechnical report or other reliable source acceptable to the building official,
- Go to the ASCE Hazard Tool Site: https://ascehazardtool.org/,
- Enter property address,
- Standard Version: Select ASCE 7-22,
- Risk Category: Select Risk Category II,
- Site Soil Class: Select Site Class from step 1,
- From results (summary, detailed, or full report), determine spectral response acceleration at short periods S_{DS} value, and
- Using the S_{DS} value, select the appropriate SDC per IRC Table R301.2.2.1.1. DO NOT USE the SDC assigned by the ASCE 7 Hazard Tool, as it is an IBC SDC, and may not be correct for IRC use.

4. 2024 International Building Code Seismic Design Category Maps

The IBC is a national model code for the design of buildings and other structures other than those addressed in the IRC. The IBC forms the basis of many locally adopted building codes in the U.S. states and territories. The IBC addresses buildings and other structures with a much broader range of occupancies and uses than does the IRC. Reflecting this, the Risk Categories under the IBC range from I to IV. With this wider range, the SDCs assigned under the IBC range from A to F, where F represents an emergency response or similar facility located in regions of very high seismic hazard and is the most critical category for design. The legend embedded in the IBC SDC maps in some cases assigns a different SDC to mapped colors depending on the Risk Category. As seen in the map key in Figure 7 to Figure 12, Risk Categories I, II, and III are grouped together, while SDCs for Risk Category IV are assigned separately. The IBC SDC maps are shown in Figure 7 to Figure 12.

4.1. What Has Been Updated

- The most current seismic hazard data and design map procedures have been included via the USGS's National Seismic Hazard Models (NSHMs) and the site-specific ground motion procedures of the 2020 NEHRP Recommended Provisions.

- New in the 2024 edition, IBC seismic hazard maps are now presented as SDC maps, similar but not identical to IRC SDC maps. These replace spectral response acceleration maps that were provided in previous editions of the IBC. SDC maps were brought into the 2024 IBC with the objective of giving both nontechnical and technical users a method to rapidly determine SDC based on a reasonably conservative assignment of default site conditions (Site Class), applicable for most building sites, while also greatly reducing the number of maps printed in the IBC. See the IBC Commentary (ICC, 2024b) for further discussion.

- Under the 2024 IBC, designers have the choice to use the IBC SDC maps or the provisions of ASCE/SEI 7 to determine SDC; it is anticipated that many design professionals will use the ASCE/SEI 7 provisions, particularly where Site Classes A through BC are applicable in which case a lower SDC might be assigned.

- The user of the IBC is no longer required to multiply mapped spectral response accelerations by Site Coefficients F_a and F_v. The Site Coefficients have been deleted from both the IBC and ASCE/SEI 7, and the site adjustments are applied in the USGS NSHM. The user simply needs to select the applicable Site Class when using the ASCE Hazard Tool.

4.2. Where the Maps Can be Used

The site soils can have a significant impact on the earthquake demands on structures, with structures on soft soils typically seeing increased demands.

- The IBC SDC maps can be conservatively used for most sites, as they are developed based on default site (soil) conditions (most critical of Site Classes C, CD, and D).

- IBC SDC maps are not permitted to be used for Site Classes DE, E, or F. For these Site Classes the IBC requires that the SDC be determined in accordance with ASCE/SEI 7.

4.3. How to Use the IBC SDC Maps

- The 2024 IBC maps can be found in print and pdf in several publications including the 2024 IBC and FEMA P-2192-4. The state and county lines on these maps provide adequate detail for assignment of the SDC in some but not all locations.

- When more detailed information on the IBC SDC is needed, as referenced in the 2024 IBC maps, USGS guidance on available tools can be found at: https://doi.org/10.5066/F7NK3C76. This link provides guidance on determination of SDC. The following is a step-wise explanation:

Steps to determine SDC as assigned by the IBC SDC maps (incorporates default Site Class):

- Go to the ASCE Hazard Tool Site: https://ascehazardtool.org/,
- Enter property address,
- Standard Version: Select ASCE 7-22,
- Risk Category: Select the applicable Risk Category based on IBC Table 1604.5,
- Site Soil Class: Select Default,
- From results (summary, detailed, or full report), determine the assigned SDC.

4.4. How to Use the ASCE/SEI 7 for Determination of Seismic Design Category

For many sites, the IBC SDC maps may provide a conservative assignment of SDC due to use of default site condition (Site Class) assumptions. This potential conservatism can be eliminated by using the IBC and ASCE/SEI 7 to determine the SDC as follows:

Steps to determine SDC for IBC design using ASCE/SEI 7 (where specific Site Class is assigned):

- Determine Site (soil) Class at site from site-specific geotechnical report or other reliable source acceptable to the building official,
- Go to the ASCE Hazard Tool Site: https://ascehazardtool.org/,
- Enter property address,
- Standard Version: Select ASCE 7-22,
- Risk Category: Select applicable Risk Category based on IBC Table1604.5,
- Site Soil Class: Select Site Class from step 1,
- From results (summary, detailed, or full report), determine the assigned SDC.

5. 2024 Updates to The National Seismic Hazard Models and the SDC Maps

As in past updates, the 2024 editions of the IRC and IBC seismic design maps have been developed in collaboration with the U.S. Geological Survey (USGS) and are based on their National Seismic Hazard Models (NSHMs), the site-specific ground motion procedures of the 2020 NEHRP Recommended Provisions (FEMA,2020a), ASCE/SEI 7-22 (ASCE,2021), and the IRC and IBC definitions of SDC. The updates to the IRC and IBC maps, like the map updates already adopted by the 2020 NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-2082) and ASCE/SEI 7-22, are based on (1) recommendations of the Project 17 collaboration

between the Building Seismic Safety Council (BSSC) and the USGS (BSSC, 2019), and (2) the 2018 update of the USGS NSHM for the conterminous U.S. The Project 17 recommendations include improvements to (1) site-class effects, (2) spectral periods defining short-period and one-second ground-motion parameters, (3) deterministic caps on the otherwise probabilistic ground motions, and (4) maximum-direction scale factors. The updates in the 2018 USGS NSHM from the previous (2014) version (used in the 2018 and 2021 versions of the IBC and IRC) include incorporation of (1) new NGA-East and other ground-motion models for the central and eastern U.S., (2) deep sedimentary basin effects in the Los Angeles, Seattle, San Francisco, and Salt Lake City regions, (3) earthquakes that occurred in 2013 through 2017, and (4) updated weights for the western U.S. ground-motion models.

In general, Project 17 and NSHM updates have not resulted in significant changes to the spectral response acceleration parameters S_{DS} and S_{D1} at default site conditions (Site Class). As a result, IRC and IBC mapped SDCs at default site conditions have generally stayed the same or increased or decreased by one. This is illustrated in the 34 predominantly western U.S. cities discussed in the commentary to Chapter 22 of the 2020 NEHRP Provisions. It is known, however, that larger changes have occurred in spectral response accelerations in parts of the central and eastern U.S. This is particularly true for soft soil sites, where changes of up to two SDCs have occurred, because the site coefficients of previous editions of the IRC and IBC, which were predominantly based on western U.S. data, have in 2024 editions been replaced with eastern U.S. data.

For the states and territories outside of the conterminous U.S., where the existing USGS NSHMs did not yet support direct development of multi-period response spectra (MPRS) needed for the above-mentioned modifications to site-class effects and spectral periods, MPRS were developed using the FEMA P-2078 “Procedures for Developing Multi-Period Response Spectra at Non-Conterminous United States Sites” (FEMA, 2020b). This is applicable in Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, Guam, the Northern Mariana Islands, and American Samoa.

Further background information on development of the 2024 IRC and IBC maps can be found in FEMA P-2192-4 (FEMA, 2023) and the 2020 NEHRP Recommended Provisions (FEMA P-2082).

References

ASCE, 2021. Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22), American Society of Civil Engineers, Reston VA.

BSSC, December 2019. Project 17 Final Report Development of the Next Generation of Seismic Design Value Maps for the 2020 NEHRP Provisions.

FEMA, 2020a. NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, 2020 Edition (FEMA P-2082-1), Federal Emergency Management Agency, Washington, DC.

FEMA, 2020b. Procedures for Developing Multi-Period Response Spectra at Non-Conterminous United States Sites (FEMA P-2078).

FEMA, 2023. 2020 NEHRP Recommended Seismic Provisions: Seismic Design Category Maps for 2024 International Residential Code (IRC) and International Building Code (IBC) (FEMA P-2192-4).

ICC, 2024 a. International Building Code, 2024 Edition, international Code Council, Country Club Hills, IL.

ICC, 2024 b. International Building Code Commentary, 2024 Edition, international Code Council, Country Club Hills, IL.

ICC, 2024 c. International Residential Code, 2024 Edition, international Code Council, Country Club Hills, IL.

Other References

FEMA, 2023. Earthquake-Resistant Design Concepts: An Introduction to Seismic Provisions for New Buildings (FEMA P-749).

FEMA, 2021. The Role of the NEHRP Recommended Seismic Provisions in the Development of Nationwide Seismic Building Code Regulations: A Thirty-Five-Year Retrospective (FEMA P-2156).

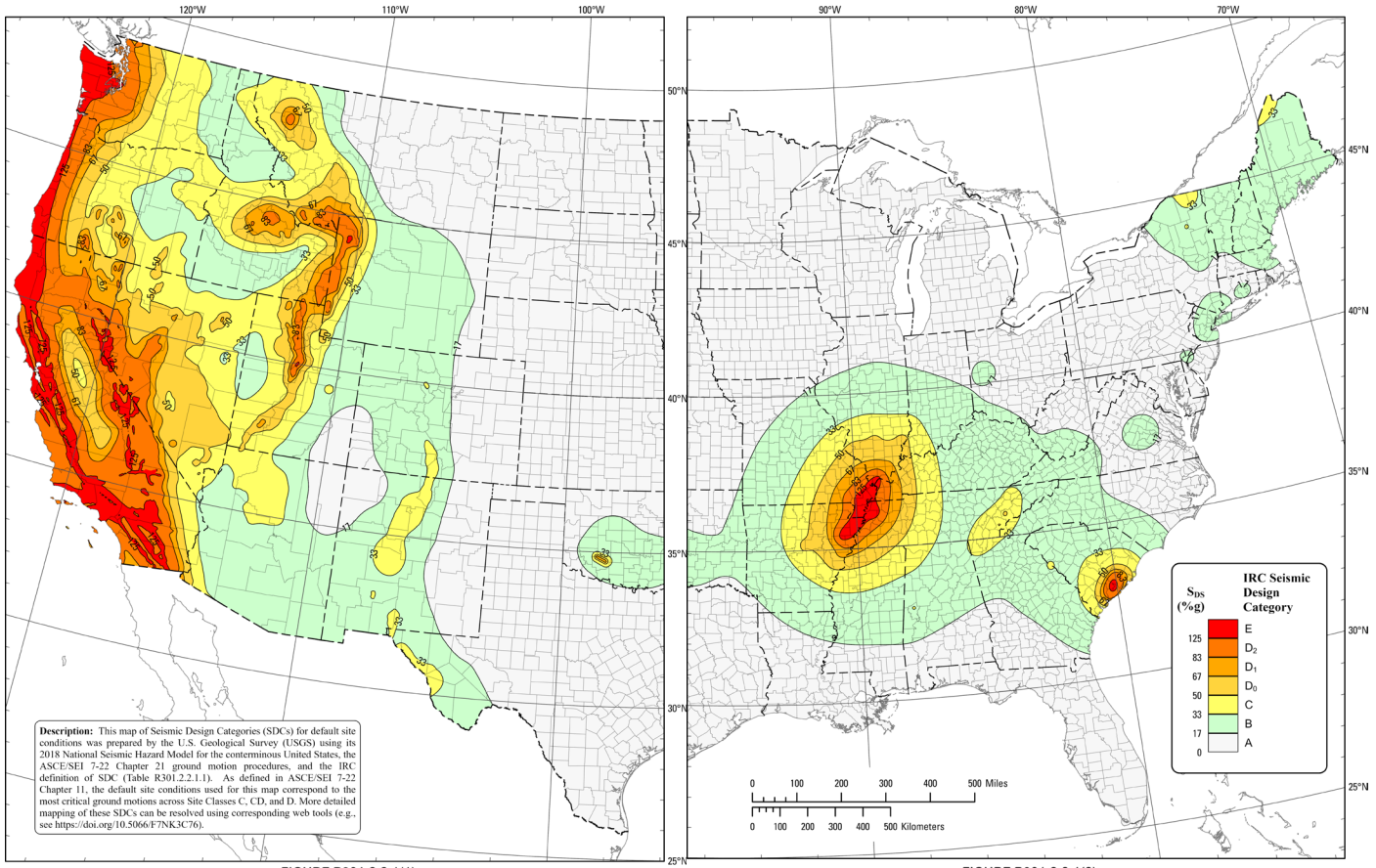
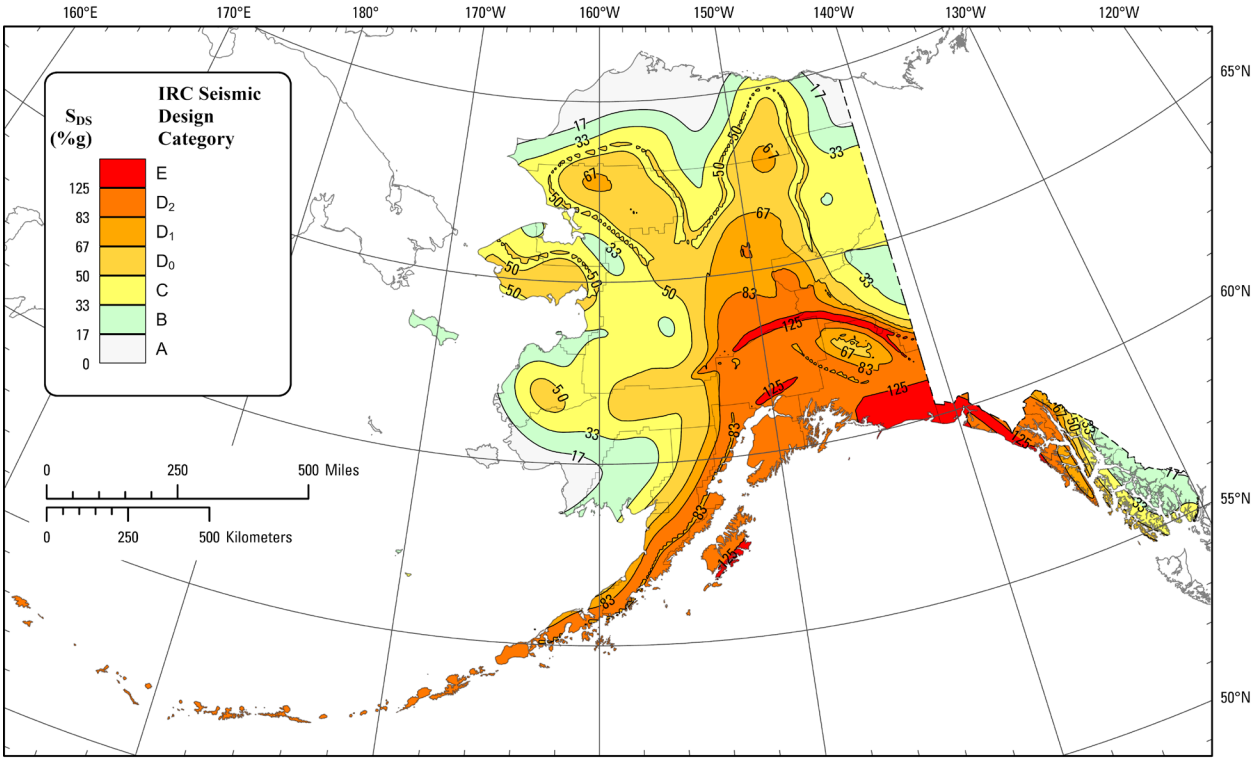


FIGURE R301.2.2.1(1)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS
FOR THE CONTERMINOUS UNITED STATES (WESTERN)

FIGURE R301.2.2.1(2)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS
FOR THE CONTERMINOUS UNITED STATES (EASTERN)

Figure 1. 2024 IRC Seismic Design Category Maps for the Conterminous United States.



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2007 National Seismic Hazard Model for Alaska, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D. More detailed mapping of these SDCs can be resolved using corresponding web tools (e.g., see https://doi.org/10.5066/F7NK3C76).

FIGURE R301.2.2.1(3)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR ALASKA

Figure 2. 2024 IRC Seismic Design Category Map for Alaska.

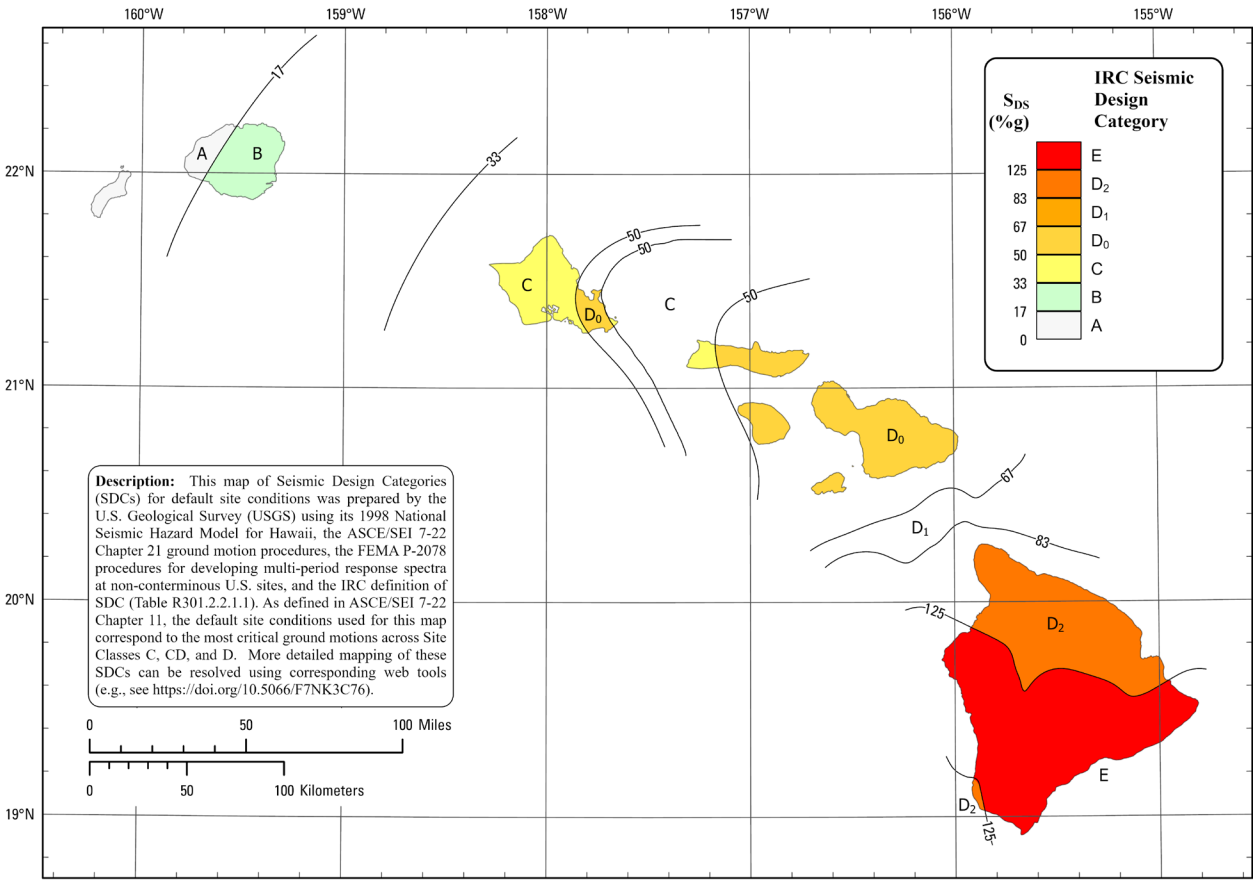
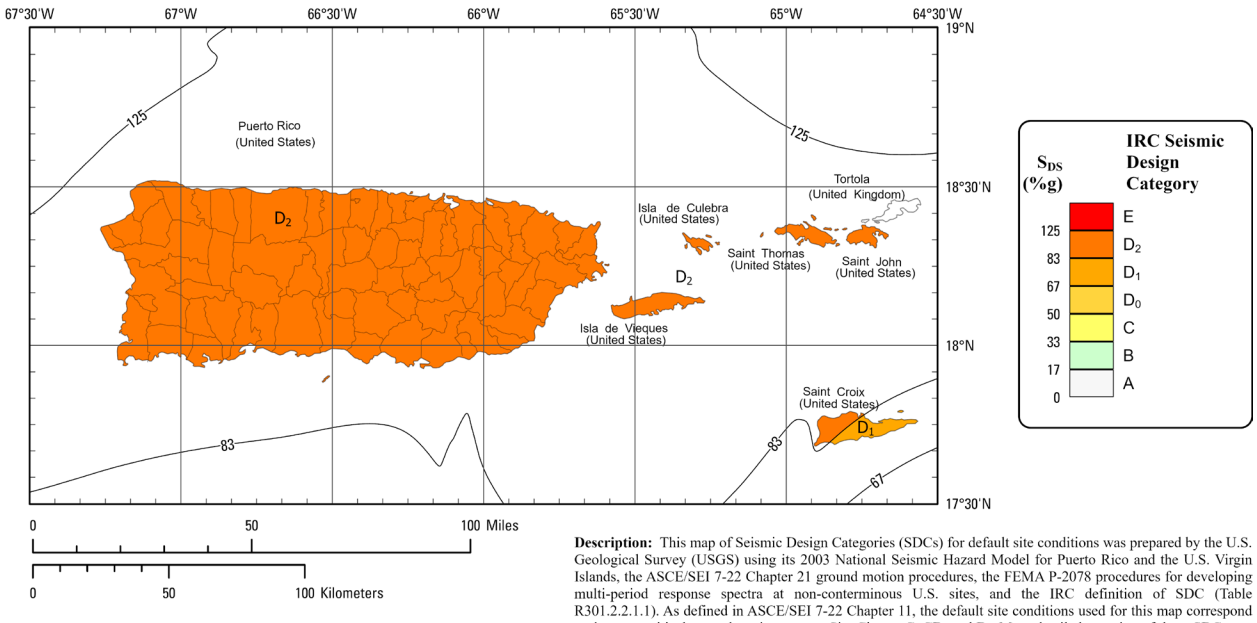


FIGURE R301.2.2.1(4)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR HAWAII

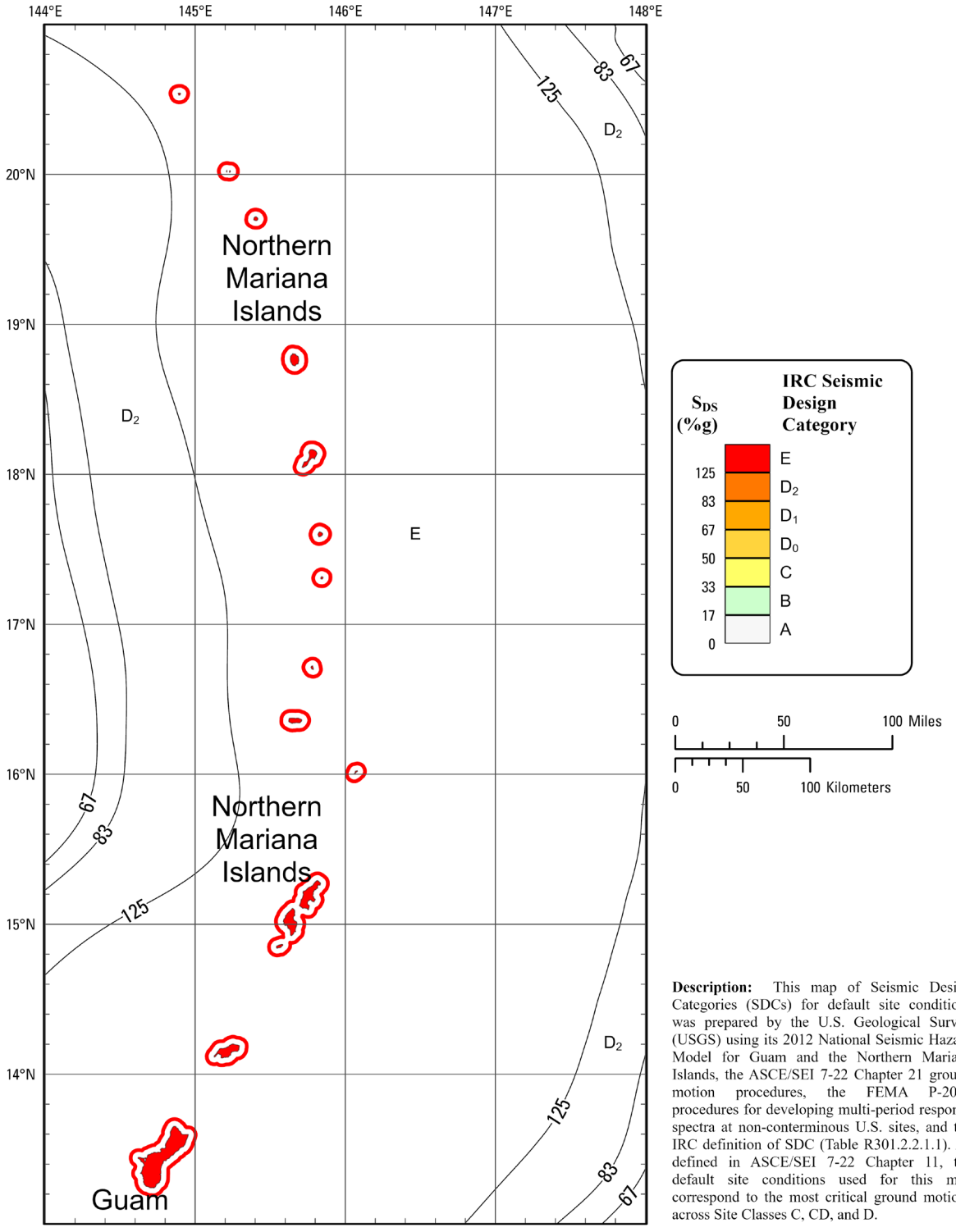
Figure 3. 2024 IRC Seismic Design Category Map for Hawaii.



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2003 National Seismic Hazard Model for Puerto Rico and the U.S. Virgin Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D. More detailed mapping of these SDCs can be resolved using corresponding web tools (e.g., see https://doi.org/10.5066/F7NK3C76).

FIGURE R301.2.2.1(5)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS
FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS

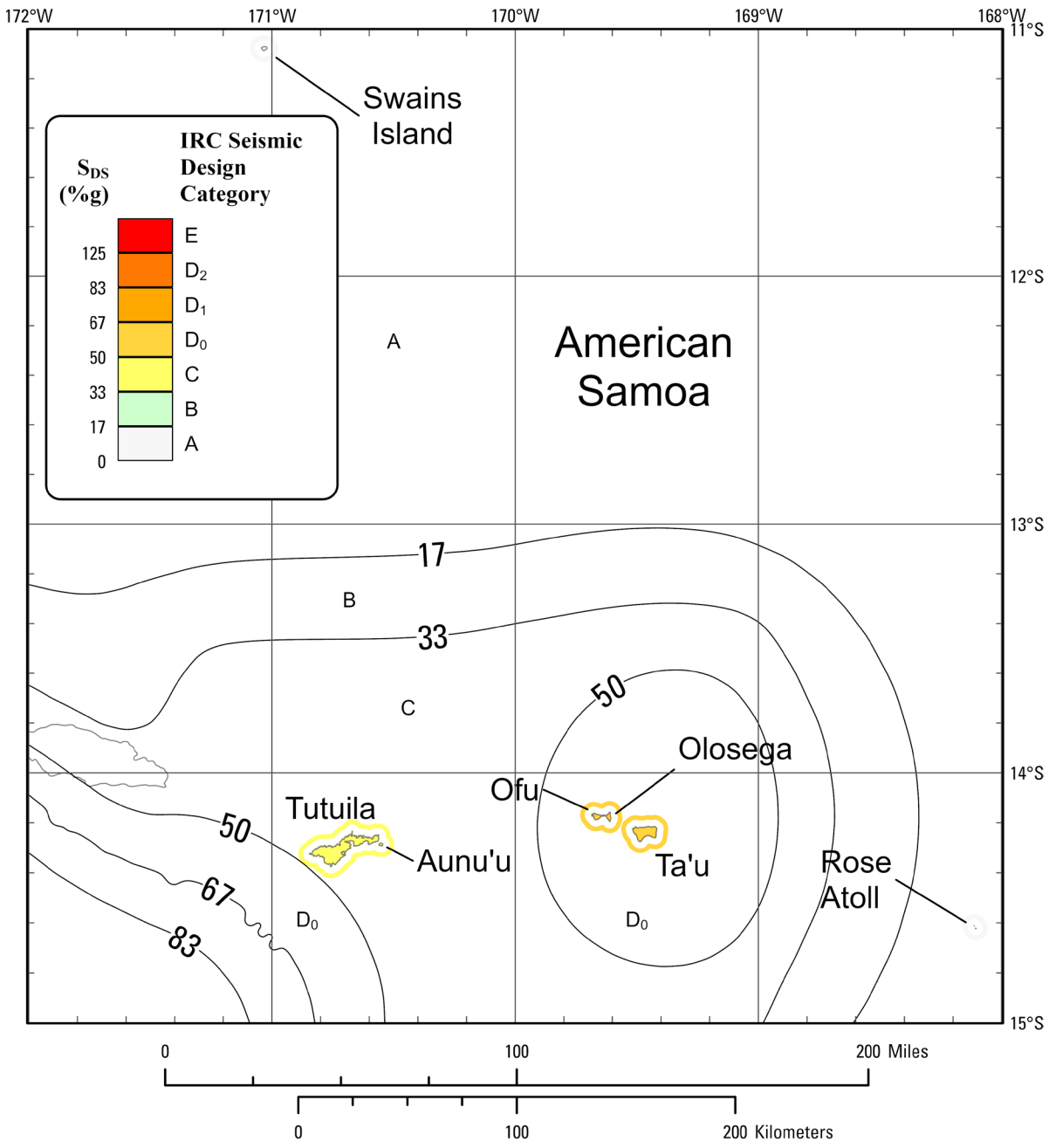
Figure 4. 2024 IRC Seismic Design Category Map for Puerto Rico and the United States Virgin Islands.



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for Guam and the Northern Mariana Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

FIGURE R301.2.2.1(6)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS
FOR GUAM AND THE NORTHERN MARIANA ISLANDS

Figure 5. 2024 IRC Seismic Design Category Map for Guam and the Northern Mariana Islands.



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for American Samoa, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the IRC definition of SDC (Table R301.2.2.1.1). As defined in ASCE/SEI 7-22 Chapter 11, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

FIGURE R301.2.2.1(7)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR AMERICAN SAMOA

Figure 6. 2024 IRC Seismic Design Category Map for American Samoa

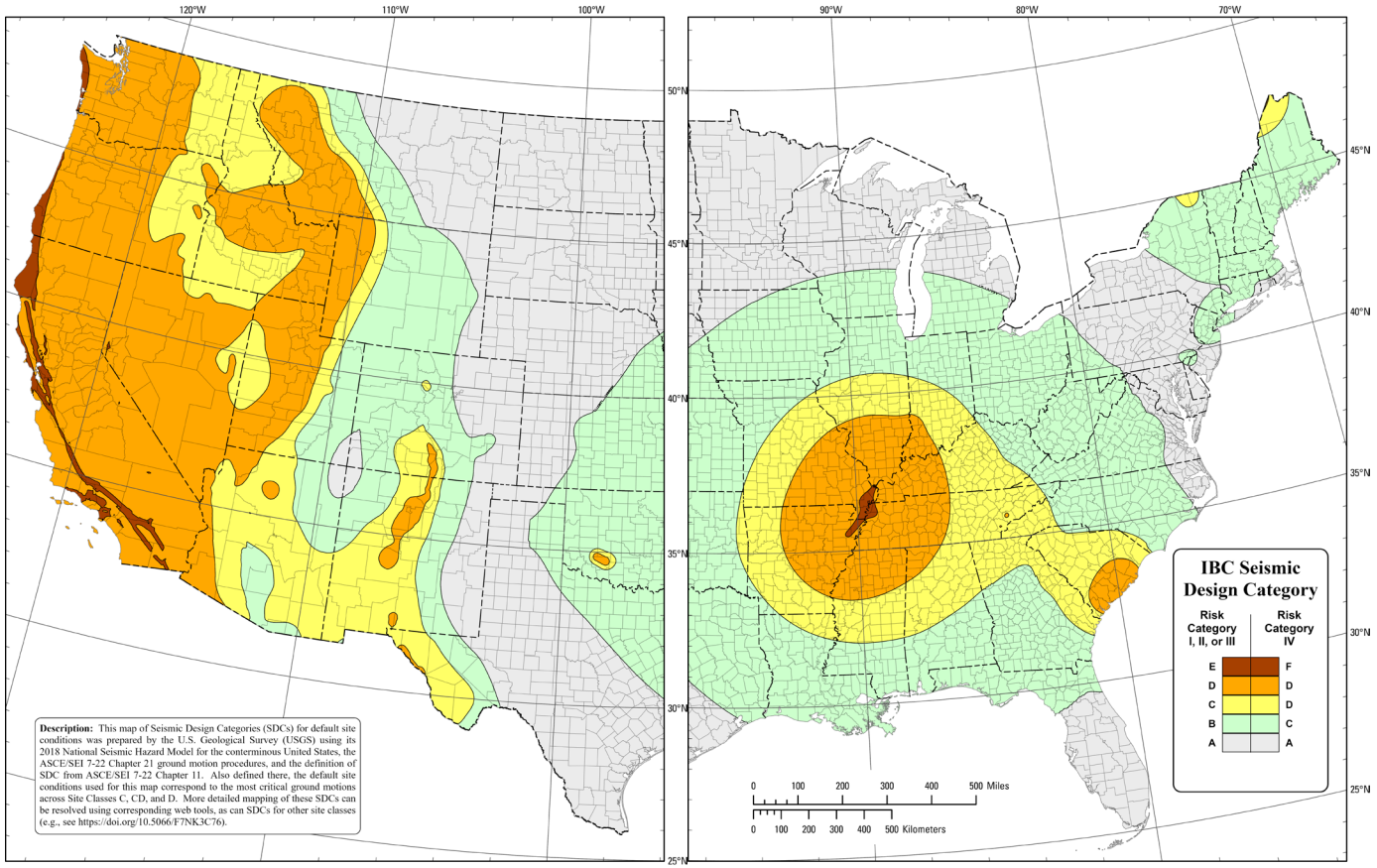
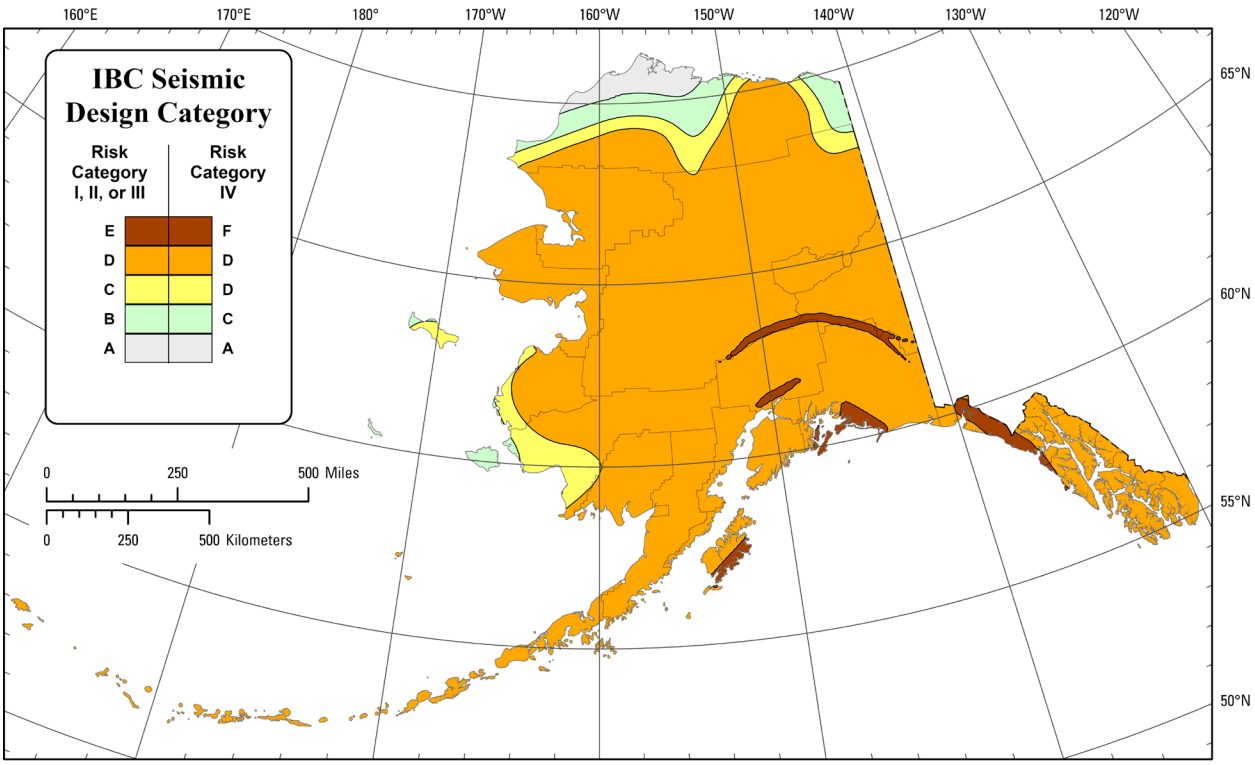


FIGURE 1613.2.1(1)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS
FOR THE CONTERMINOUS UNITED STATES (WESTERN)

FIGURE 1613.2.1(2)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS
FOR THE CONTERMINOUS UNITED STATES (EASTERN)

Figure 7. 2024 IBC Seismic Design Category Maps for the Conterminous United States



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2007 National Seismic Hazard Model for Alaska, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D. More detailed mapping of these SDCs can be resolved using corresponding web tools, as can SDCs for other site classes (e.g., see https://doi.org/10.5066/F7NK3C76).

FIGURE 1613.2.1(3)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR ALASKA

Figure 8. 2024 IBC Seismic Design Category Map for Alaska

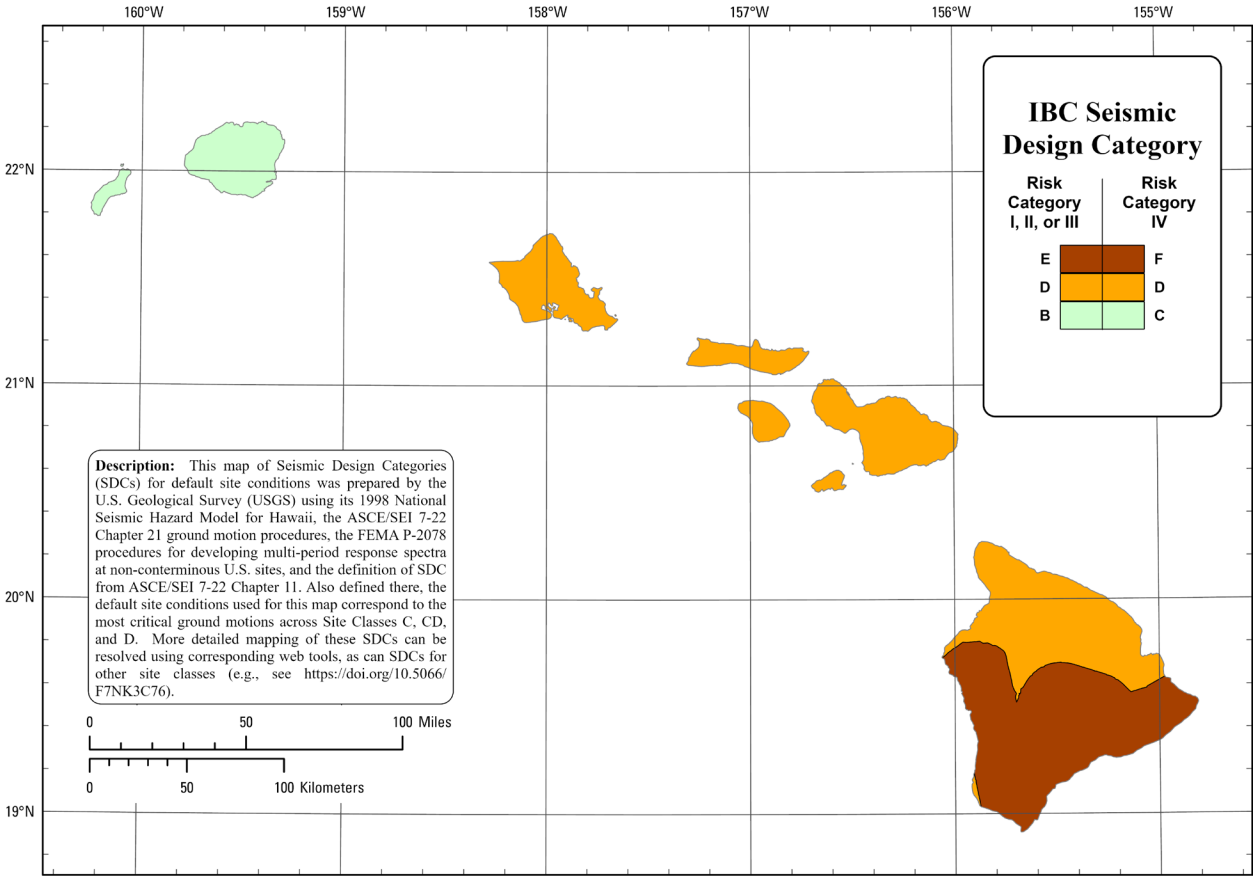
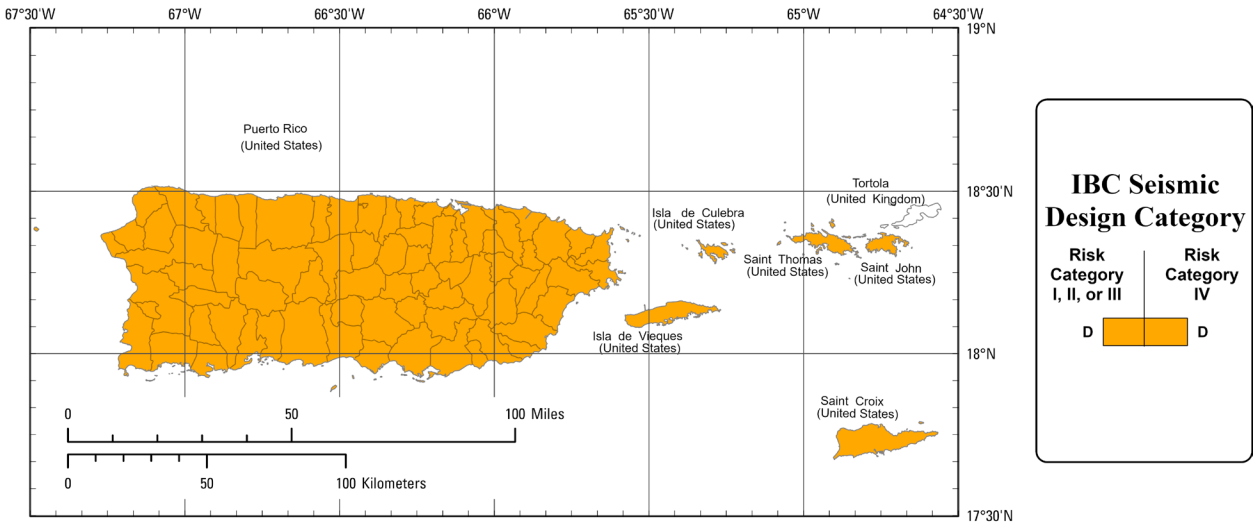


FIGURE 1613.2.1(4)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR HAWAII

Figure 9. 2024 IBC Seismic Design Category Map for Hawaii.



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2003 National Seismic Hazard Model for Puerto Rico and the U.S. Virgin Islands, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

FIGURE 1613.2.1(5)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS
FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS

Figure 10. 2024 IBC Seismic Design Category Map for Puerto Rico and the United States Virgin Islands.

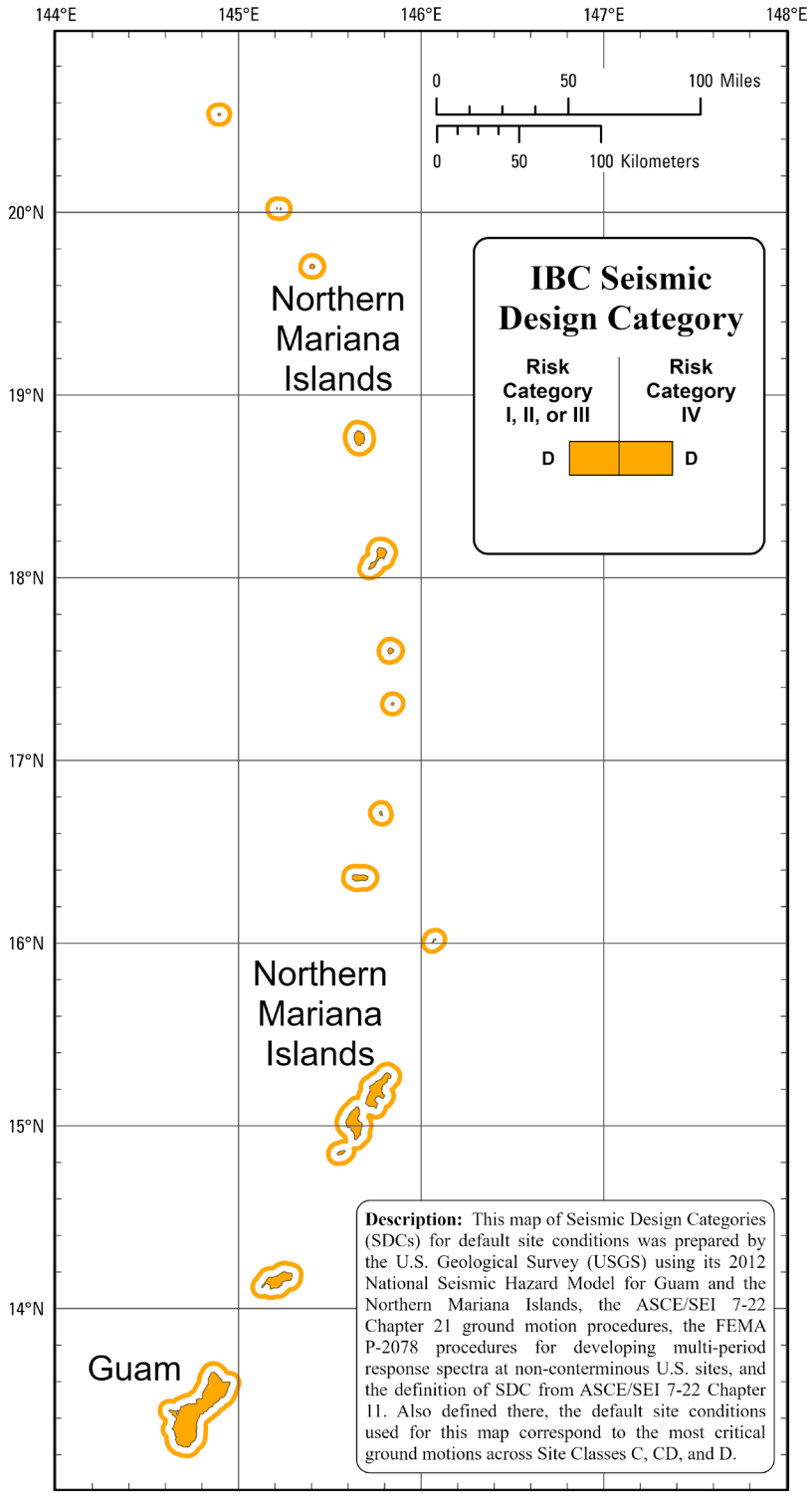
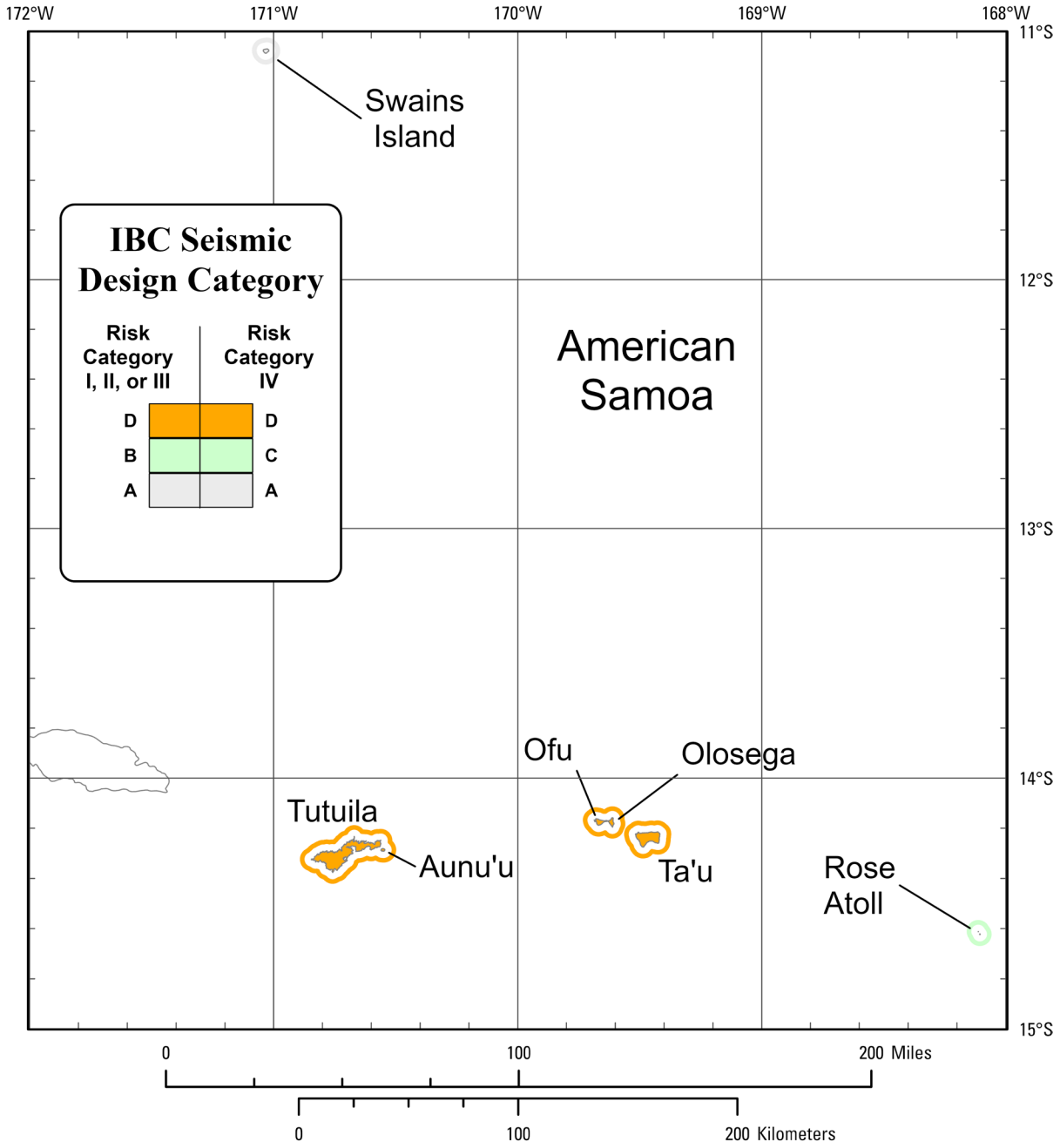


FIGURE 1613.2.1(6)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS FOR GUAM AND THE NORTHERN MARIANA ISLANDS

Figure 11. 2024 IBC Seismic Design Category Map for Guam and the Northern Mariana Islands.



Description: This map of Seismic Design Categories (SDCs) for default site conditions was prepared by the U.S. Geological Survey (USGS) using its 2012 National Seismic Hazard Model for American Samoa, the ASCE/SEI 7-22 Chapter 21 ground motion procedures, the FEMA P-2078 procedures for developing multi-period response spectra at non-conterminous U.S. sites, and the definition of SDC from ASCE/SEI 7-22 Chapter 11. Also defined there, the default site conditions used for this map correspond to the most critical ground motions across Site Classes C, CD, and D.

FIGURE 1613.2.1(7)
SEISMIC DESIGN CATEGORIES FOR DEFAULT SITE CONDITIONS
FOR AMERICAN SAMOA

Figure 12. 2024 IBC Seismic Design Category Map for American Samoa.