

# Nationwide Public Safety Broadband Network

## Final Programmatic Environmental Impact Statement

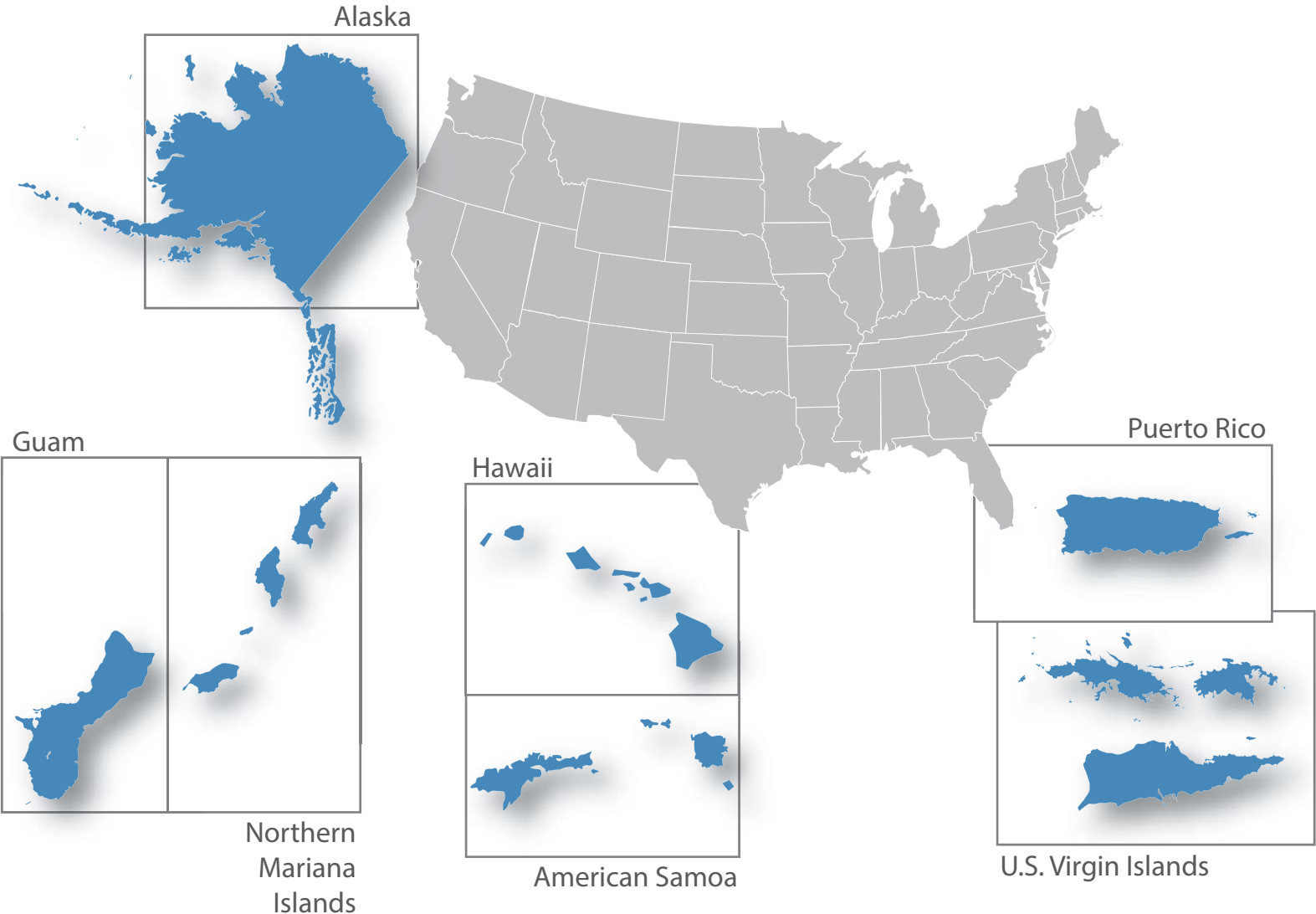
### for the Non-Contiguous United States



## First Responder Network Authority

Volume 8 - Chapters 10-18 & Appendices

- Alaska
- Hawaii
- American Samoa
- Guam
- Northern Mariana Islands
- Puerto Rico
- U.S. Virgin Islands



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# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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#### **Cooperating Agencies**

Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

May 2017

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## ACRONYMS AND ABBREVIATIONS

|                   |  |                   |   |
|-------------------|--|-------------------|---|
| °F                | degree Fahrenheit  | ASPA              | American Samoa Power Authority  |
| °N                | degrees north  | ATO               | Air Traffic Organization  |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center   |
| µPa               | micro Pascal   | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent  | BACT              | best available control technology                                     |
| A                 | attained   | BCE               | before Common Era   |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions   |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management   |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice  |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island  |
| AGL               | above ground level   | BWG               | BioInitiative Working Group   |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act   |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch  |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board  |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control  |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era  |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations   |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second   |
| AS                | Alaska Statute   | CH <sub>4</sub>   | methane   |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center  |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency   |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide   |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide  |
|                   |  | CO <sub>2</sub> e | carbon dioxide equivalents  |
|                   |  | COMAR             | Committee on Man and Radiation  |



|         |  |                  |   |
|---------|--|------------------|---|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific  | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register  |
| CWA     | Clean Water Act  | ft               | feet  |
| CZMA    | Coastal Zone Management Act  | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile  |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)   | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)  | GHG              | greenhouse gas  |
| DBCP    | 1,2-dibromo-3-chloropropane  | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)  | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane  | GOA              | Gulf of Alaska  |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide  |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture  | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense  | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy  | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health   | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower  |
| DPS     | Department of Public Safety  | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment   | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System   | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System   | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide   | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat   | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services   | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order  | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power   | in               | inches  |
| ESA     | Endangered Species Act   | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation  |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device  | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |   |                   |   |
|--------------------|---|-------------------|---|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day  | NOx               | nitrogen oxides   |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park   |
| LBJ                | Lyndon B. Johnson   | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service   |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal  | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second  | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz   | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement  |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam  |
| mph                | miles per hour  | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol   |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law  |
| N <sub>2</sub> O   | nitrous oxide   | PM                | particulate matter  |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence  |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million   |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name  | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast   | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law  |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |   |
| NFIP               | National Flood Insurance Program                          |                   |   |
| NFIRS              | National Fire Incident Reporting System                   |                   |   |
| NHPA               | National Historic Preservation Act                        |                   |   |
| NIR                | non-ionizing radiation                                    |                   |   |
| NMFS               | National Marine Fisheries Service                         |                   |   |
| NMHC               | non-methane hydrocarbon compounds                         |                   |   |
| NMOG               | non-methane organic compounds                             |                   |   |
| NNE                | north-northeast   |                   |   |

|                 |  |                  |   |
|-----------------|--|------------------|---|
| PV              | photovoltaic   | UVA              | University of Virginia                                      |
| RAN             | radio access network   | VdB              | vibration decibel(s)  |
| RCP             | Representative Concentration Pathway   | VIC              | Virgin Islands Code   |
| RCRA            | Resource Conservation and Recovery Act   | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency  | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number   | VOC              | volatile organic compound                                   |
| rms             | root mean square   | vog              | volcanic smog   |
| ROW             | right-of-way   | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards  | W                | watt(s)   |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error  | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan  | WNP              | Western North Pacific                                       |
| SLR             | sea level rise   | WNW              | west-northwest  |
| SMA             | Special Management Area  | WPC              | watts per channel   |
| SMS             | Scenery Management System  | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide   |                  |   |
| SO <sub>x</sub> | sulfur oxides  |                  |   |
| SPCC            | Spill Prevention, Control, and Countermeasure  |                  |   |
| SPCZ            | South Pacific Convergence Zone   |                  |   |
| SPOC            | State Single Point of Contact  |                  |   |
| SRES            | Special Report on Emission Scenarios   |                  |   |
| SSA             | sole source aquifer  |                  |   |
| STATSGO2        | State Soil Geographic [Database]   |                  |   |
| SW              | southwest  |                  |   |
| TAAQS           | Territory Ambient Air Quality Standards  |                  |   |
| TCP             | traditional cultural property  |                  |   |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |   |
| TMDL            | Total Maximum Daily Load   |                  |   |
| TOC             | total organic compound   |                  |   |
| tpy             | tons per year  |                  |   |
| TRI             | Toxic Release Inventory  |                  |   |
| TSCA            | Toxic Substances Control Act   |                  |   |
| U.S.            | United States  |                  |   |
| UAMES           | University of Alaska Museum Earth Sciences   |                  |   |
| USACE           | U.S. Army Corps of Engineers   |                  |   |
| USC             | United States Code   |                  |   |
| USDA            | U.S. Department of Agriculture   |                  |   |
| USDI            | U.S. Department of the Interior  |                  |   |
| USEPA           | U.S. Environmental Protection Agency   |                  |   |
| USFWS           | U.S. Fish and Wildlife Service   |                  |   |
| USGCRP          | U.S. Global Climate Change Research Program  |                  |   |
| USGS            | U.S. Geological Survey   |                  |   |
| USVIDOH         | U.S. Virgin Islands Department of Health   |                  |   |
| USVIPD          | U.S. Virgin Islands Police Department  |                  |   |

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## 12. COMPARISON OF ALTERNATIVES

### 12.1. INTRODUCTION

This chapter presents, in summary form, impact ratings for the Preferred Alternative, as well as each of the remaining alternatives outlined in Section 2.2, Description of Alternatives.

Under the Preferred Alternative, FirstNet and/or their partners would construct a nationwide broadband LTE network using a combination of the wired, wireless, deployable, and satellite technologies. There is currently a wide range of technologies that FirstNet may use to implement and deploy the Nationwide Public Safety Broadband Network (NPSBN). Full descriptions of wired, wireless and deployable projects that FirstNet may consider are explained in Section 2.1.2, Proposed Action Infrastructure.

Under the Deployable Technologies Alternative, FirstNet and/or their partners would procure, deploy, and maintain a nationwide fleet of mobile communications systems, including ground-based and aerial deployable technologies, to provide temporary coverage in areas not covered by existing, usable infrastructure. There would be no collocation of equipment and no new construction associated with wired or wireless projects discussed above under the Preferred Alternative. Some limited construction could be associated with implementation such as land clearing or paving for parking or staging areas. Generally, these units would be deployed at times of an incident to the affected area for either planned or unplanned incidents or events. Equipment would be stationed in every state and territory, often at multiple locations in each state or territory, to facilitate suitable response. These mobile communication units would be temporarily installed and may use existing satellite, microwave, or radio systems for backhaul.

Under the No Action Alternative, the NPSBN would not be constructed; there would be no nationwide, coordinated system dedicated to public safety interoperable communications. The existing multiplicity of communications networks would remain in place, as would the current, known limitations and problems of existing communication networks during times of emergency or disaster. This alternative would require an act of Congress to revise the Act, which currently requires the NPSBN.

This Final Programmatic Environmental Impact Statement contains seven stand-alone chapters devoted to each of the seven states or territories in the Non-Contiguous U.S. region (see Chapters 3 through 9). Each of these chapters discusses fifteen separate resource areas, such as biological resources, land use, air quality, etc. and discusses the potential impacts of (or to) the Proposed Action in an Environmental Consequences section.

Through the programmatic approach, FirstNet has identified four categories of potential impacts at the programmatic level to these resources:

1. *Potentially significant*
2. *Less than significant with best management practices (BMPs) and mitigation measures incorporated*
3. *Less than significant*
4. *No impact*

Two exceptions exist to this categorization of potential impacts based on applicable, resource-specific regulations. For threatened and endangered species and species of conservation concern, categories of potential impacts are defined as: *may affect, likely to adversely affect; may affect, not likely to adversely affect; and no effect*. These impact categories are comparable to those defined in the *Endangered Species Consultation Handbook (USFWS and NMFS 1998)*. In Table 12.2-1, the following numeric values have been assigned for the purpose of equivalency:

1. *May affect, likely to adversely affect*<sup>1</sup>
2. *May affect, not likely to adversely affect*
4. *No effect*

For cultural resources, categories of potential impacts are defined as an *adverse effect; mitigated adverse effect; effect, but not adverse; and no effect*. These impact categories are comparable to those defined in *36 CFR § 800, Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS 1983)*, and the U.S. National Park Service's *National Register Bulletin: How to Apply the National Register Criteria for Evaluation (NPS 2002)*. In Table 12.2-1, the following numeric values have been assigned for the purpose of equivalency:

1. *Adverse effect*
2. *Mitigated adverse effect*
3. *Effect, but not adverse*
4. *No effect*

## 12.2. COMPARISON OF ALTERNATIVES

Table 12.2-1 below presents impact ratings at the programmatic level of the preferred and remaining alternatives in summary form. Numerical ratings represent whole number averages of ratings across states and territories, rounded conservatively to err on the side of greater potential impact significance.

---

<sup>1</sup> For all impact ratings where a potential affect is found, full and effective implementation of mitigation is assumed.

Evaluation of potential impacts was determined by the nature of both the deployment and operation of the infrastructure associated with each project alternative considered, the Preferred Alternative and the Deployable Technologies Alternative. The specific infrastructure associated with the Deployable Technologies Alternative would be the same as the deployable technologies implemented as part of the Preferred Alternative but would likely be implemented in greater numbers, over a larger geographic extent, and used with greater frequency and duration. It would not include fixed infrastructure such as towers or buried or aerial fiber.

As a result, potential impacts associated with the two project alternatives are generally similar. For most resources, impact ratings are identical, although some differences exist for some resource areas. For example, the Preferred Alternative would have somewhat greater potential impacts than the Deployable Technologies Alternative to water resources, wildlife, and visual resources. Conversely, the Deployable Technologies Alternative would have somewhat greater potential impacts than the Preferred Alternative to air resources.

The No Action Alternative would have no impacts, since by definition no system would be deployed and existing conditions would not change. As required by the National Environmental Policy Act, this alternative is used as a baseline against which the potential impacts of the action alternatives are compared. However, the No Action Alternative would not achieve the Proposed Action's stated purpose or meet the project need as required by the Middle Class Tax Relief and Job Creation Act of 2012 (*Pub. L. No. 112-96, Title VI, 126 Stat. 156 codified at 47 USC § 1401 et seq.*), and as such it would require an act of Congress in order for the No Action Alternative to take place.

Although Table 12.2-1 below focuses primarily on potential adverse impacts at the programmatic level, it is important to note that the ultimate outcome of the NPSBN would provide first responders with the tools they need to do their jobs more effectively and minimize the loss of life in the event of any future natural or manmade emergencies or disasters. In addition, likely substantial beneficial impacts associated with the NPSBN could occur as a result of the creation of direct, indirect, and induced employment. This could occur through new jobs associated with Proposed Action (direct), its contractors and subcontractors (indirect), and other business that serve the Proposed Action employees, contractors, or subcontractors (induced). The Proposed Action could also positively affect economic conditions through equipment purchases and changes in tax revenue, wages, and spending.

**Table 12.2-1: Comparison of Alternatives by Resource Area and Type of Effect<sup>2</sup>**

| Resource Area/Type of Effect   | Preferred Alternative |            | Deployable Technologies Alternative |            | No Action Alternative |
|--|-----------------------|------------|-------------------------------------|------------|-----------------------|
|  | Deployment            | Operations | Deployment                          | Operations |                       |
| Infrastructure   |                       |            |                                     |            |                       |
| Transportation system capacity and safety  | 3                     | 3          | 3                                   | 3          | 4                     |
| Strain on capacity of local health, public safety, and emergency response services   | 3                     | 3          | 3                                   | 3          | 4                     |
| Modifies existing public safety response telecommunication practices, physical infrastructure, or level of service in a manner that directly affects public safety communication capabilities and response times | 3                     | 3          | 3                                   | 3          | 4                     |
| Effects to commercial telecommunication systems, communications, or level of service   | 3                     | 3          | 3                                   | 3          | 4                     |
| Effects to utilities, including electric power transmission facilities and water and sewer facilities  | 3                     | 3          | 3                                   | 3          | 4                     |
| Soils  |                       |            |                                     |            |                       |
| Soil erosion   | 3                     | 3          | 3                                   | 3          | 4                     |
| Topsoil mixing   | 3                     | 3          | 3                                   | 3          | 4                     |
| Soil compaction and rutting  | 3                     | 3          | 3                                   | 3          | 4                     |
| Geology  |                       |            |                                     |            |                       |
| Potential Impacts of the Project   |                       |            |                                     |            |                       |
| Surface geology, bedrock, topography, physiography, and geomorphology  | 3                     | 3          | 3                                   | 3          | 4                     |
| Mineral and fossil fuel resource impacts   | 3                     | 3          | 3                                   | 3          | 4                     |
| Paleontological resources impacts  | 3                     | 3          | 3                                   | 3          | 4                     |

<sup>2</sup> While the analysis indicates that certain locations could have higher or lower impact ratings, this table is evaluating the potential regional impacts (not state- or territory-specific) associated with the Proposed Action. Site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work.



| Resource Area/Type of Effect  | Preferred Alternative |            | Deployable Technologies Alternative |            | No Action Alternative |
|---|-----------------------|------------|-------------------------------------|------------|-----------------------|
|   | Deployment            | Operations | Deployment                          | Operations |                       |
| Potential Impacts to the Project  |                       |            |                                     |            |                       |
| Seismic hazard  | 3                     | 3          | 3                                   | 3          | 4                     |
| Volcanic activity   | 3                     | 3          | 3                                   | 3          | 4                     |
| Landslide   | 3                     | 3          | 3                                   | 3          | 4                     |
| Land subsidence   | 3                     | 3          | 3                                   | 3          | 4                     |
| Water Resources   |                       |            |                                     |            |                       |
| Water Quality (groundwater and surface water) - sedimentation, pollutants, water temperature            | 3                     | 3          | 3                                   | 3          | 4                     |
| Floodplain degradation <sup>a</sup>   | 3                     | 3          | 3                                   | 4          | 4                     |
| Drainage pattern alteration   | 3                     | 3          | 3                                   | 4          | 4                     |
| Flow alteration   | 4                     | 4          | 4                                   | 4          | 4                     |
| Changes in groundwater or aquifer characteristics   | 3                     | 3          | 3                                   | 4          | 4                     |
| Wetlands <sup>3</sup>   |                       |            |                                     |            |                       |
| Direct wetland loss (fill or conversion to non-wetland), other direct and indirect effects <sup>b</sup> | 3                     | 3          | 3                                   | 3          | 4                     |
| Biological Resources  |                       |            |                                     |            |                       |
| Vegetation  |                       |            |                                     |            |                       |
| Vegetation and habitat loss, alteration, or fragmentation   | 3                     | 3          | 3                                   | 3          | 4                     |
| Invasive species effects  | 3                     | 3          | 3                                   | 3          | 4                     |
| Wildlife  |                       |            |                                     |            |                       |
| Amphibians and reptiles   | 3                     | 3          | 3                                   | 3          | 4                     |
| Terrestrial mammals   | 3                     | 3          | 3                                   | 3          | 4                     |
| Marine mammals  | 3                     | 3          | 3                                   | 3          | 4                     |
| Bats (radio frequency emissions)  | 3                     | 2          | 3                                   | 3          | 4                     |
| Birds (radio frequency emissions, tower collisions)   | 3                     | 2          | 3                                   | 3          | 4                     |
| Terrestrial invertebrates   | 3                     | 3          | 3                                   | 3          | 4                     |

<sup>3</sup> Potential wetland impacts in American Samoa would be *less than significant with BMPs and mitigation measures incorporated* since wetlands comprise less than 1 percent of the area on American Samoa and are a rare habitat type.

| Resource Area/Type of Effect   | Preferred Alternative |            | Deployable Technologies Alternative |            | No Action Alternative |
|--|-----------------------|------------|-------------------------------------|------------|-----------------------|
|  | Deployment            | Operations | Deployment                          | Operations |                       |
| Fisheries  |                       |            |                                     |            |                       |
| Direct injury/mortality  | 3                     | 3          | 3                                   | 3          | 4                     |
| Vegetation and habitat loss  | 3                     | 3          | 3                                   | 3          | 4                     |
| Indirect injury  | 3                     | 3          | 3                                   | 3          | 4                     |
| Migration effects  | 3                     | 3          | 3                                   | 3          | 4                     |
| Reproductive effects   | 3                     | 3          | 3                                   | 3          | 4                     |
| Effects of invasive species  | 3                     | 3          | 3                                   | 3          | 4                     |
| Threatened and Endangered Species and Species of Conservation Concern <sup>4</sup>   |                       |            |                                     |            |                       |
| Marine mammals   | 2                     | 2          | 2                                   | 2          | 4                     |
| Terrestrial mammals  | 2                     | 2          | 2                                   | 2          | 4                     |
| Birds  | 2                     | 2          | 2                                   | 2          | 4                     |
| Reptiles   | 2                     | 2          | 2                                   | 2          | 4                     |
| Fish   | 2                     | 2          | 2                                   | 2          | 4                     |
| Invertebrates  | 2                     | 2          | 2                                   | 2          | 4                     |
| Plants   | 2                     | 2          | 2                                   | 2          | 4                     |
| Land Use, Airspace, and Recreation   |                       |            |                                     |            |                       |
| Direct land use change (site of FirstNet facility installation or deployable base)   | 3                     | 3          | 4                                   | 3          | 4                     |
| Indirect land use change (site of FirstNet facility installation or deployable base)   | 3                     | 3          | 4                                   | 3          | 4                     |
| Use of airspace (at and near site of FirstNet facility installation or deployable base)  | 3                     | 3          | 3                                   | 3          | 4                     |
| Loss of access to public or private recreation land  | 3                     | 3          | 4                                   | 3          | 4                     |
| Loss of enjoyment of public or private recreation land (due to visual, noise, or other impacts that make recreational activity less desirable) | 3                     | 3          | 4                                   | 3          | 4                     |

<sup>4</sup> Categories of impacts are defined as: *may affect*, *likely to adversely affect*; *may affect, not likely to adversely affect*; and *no effect*. These impact categories are comparable to those defined in the *Endangered Species Consultation Handbook* (USFWS and NMFS 1998).

| Resource Area/Type of Effect   | Preferred Alternative |                  | Deployable Technologies Alternative |            | No Action Alternative |
|--|-----------------------|------------------|-------------------------------------|------------|-----------------------|
|  | Deployment            | Operations       | Deployment                          | Operations |                       |
| Visual Resources   |                       |                  |                                     |            |                       |
| Adverse change in aesthetic character  | 3                     | 3 <sup>(5)</sup> | 3                                   | 3          | 4                     |
| Nighttime lighting (overall)   | 3                     | 3                | 3                                   | 3          | 4                     |
| Nighttime lighting (isolated rural areas or if sited near a national park)   | 3                     | 2                | 3                                   | 3          | 4                     |
| Socioeconomics   |                       |                  |                                     |            |                       |
| Potential impacts to real estate   | 3                     | 3                | 4                                   | 3          | 4                     |
| Potential economic benefits or adverse impacts related to changes in tax revenues, wages, or direct spending (could be beneficial or adverse)                              | 3                     | 3                | 3                                   | 3          | 4                     |
| Employment   | 3                     | 3                | 3                                   | 3          | 4                     |
| Increased pressure on existing public services   | 3                     | 3                | 4                                   | 4          | 4                     |
| Diminished social cohesion/disruption related to influx  | 3                     | 3                | 4                                   | 4          | 4                     |
| Reduced opportunities for subsistence practices  | 3                     | 3                | 4                                   | 3          | 4                     |
| Environmental Justice  |                       |                  |                                     |            |                       |
| Effects associated with other resource areas (e.g., cultural resources) that have environmental justice implications due to the affected parties (as defined by EO 12898). | 3 <sup>(6)</sup>      | 3                | 3                                   | 3          | 4                     |

<sup>5</sup> Additional BMPs and mitigation measures may be implemented for towers.

<sup>6</sup> Since environmental justice impacts occur at the site-specific level, site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work. BMPs and mitigation measures may be required to address potential impacts to environmental justice communities at the site-specific level.

| Resource Area/Type of Effect   | Preferred Alternative |            | Deployable Technologies Alternative |            | No Action Alternative |
|--|-----------------------|------------|-------------------------------------|------------|-----------------------|
|  | Deployment            | Operations | Deployment                          | Operations |                       |
| Cultural Resources <sup>7</sup>  |                       |            |                                     |            |                       |
| Direct effects to historic properties <sup>c</sup>                                   | 3                     | 3          | 3                                   | 3          | 4                     |
| Indirect effects to historic properties (i.e. visual, noise, vibration, atmospheric) | 3                     | 3          | 3                                   | 3          | 4                     |
| Loss of access to historic properties  | 3                     | 3          | 3                                   | 3          | 4                     |
| Air Quality  |                       |            |                                     |            |                       |
| Increased air emissions  | 3                     | 3          | 3                                   | 3          | 4                     |
| Noise and Vibrations   |                       |            |                                     |            |                       |
| Increased noise and vibration levels   | 3                     | 3          | 3                                   | 3          | 4                     |
| Climate Change   |                       |            |                                     |            |                       |
| Contribution to climate change through GHG emissions                                 | 3                     | 3          | 3                                   | 3          | 4                     |
| Effect of climate change on Proposed Action-related impacts                          | 4                     | 1-2        | 4                                   | 4          | 4                     |
| Human Health and Safety  |                       |            |                                     |            |                       |
| Potential exposure to hazardous materials  | 3                     | 3          | 3                                   | 4          | 4                     |
| Accidents and Injuries   | 3                     | 3          | 3                                   | 3          | 4                     |
| Exposure to Noise  | 3                     | 3          | 3                                   | 3          | 4                     |
| Communicable Disease   | 3                     | 3          | 3                                   | 3          | 4                     |

EO = Executive Order; GHG = greenhouse gas

Note: Impact ratings and colors are as follows:

1. (Red) *Potentially significant*
- 1-2. (White) Range of *potentially significant* to *less than significant with BMPs and mitigations measures incorporated*
2. (Orange) *Less than significant with BMPs and mitigations measures incorporated*
3. (Yellow) *Less than significant*
4. (Green) *No impact*

Note: The impact ratings used for the evaluation of Threatened and Endangered Species and Species of Conservation Concern are as follows:

1. (Red) *May affect, likely to adversely affect*
2. (Orange) *May affect, not likely to adversely affect*
4. (Green) *No effect*

<sup>7</sup> Categories of impacts defined as an *adverse effect*; *mitigated adverse effect*; *effect, but not adverse*; and *no effect* are comparable to those defined in 36 CFR § 800, Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS 1983), and the U.S. National Park Service's *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (NPS 2002).

Note: Impact ratings for the evaluation of cultural resources are as follows:

1. (Red) *Adverse effect*
2. (Orange) *Mitigated adverse effect*
3. (Yellow) *Effect, but not adverse*
4. (Green) *No effect*

<sup>a</sup> Because public safety infrastructure is considered a critical facility, Proposed Action activities should avoid the 500-year floodplain wherever practicable per the Executive Orders on Floodplain Management (*EO 11988 and EO 13690*).

<sup>b</sup> Indirect effects are those resulting from direct effects, but they occur elsewhere in space and/or time.

<sup>c</sup> Per the National Historic Preservation Act, an historic property is defined as any district, archaeological site, building, structure, or object that is either listed or eligible for listing in the National Register of Historic Places (NRHP). Cultural resources present within an individual project's Area of Potential Effect are not historic properties if they do not meet the eligibility requirements for listing in the NRHP. Sites of religious and/or cultural significance refer to areas of concern to Indian tribes and other consulting parties that, in consultation with the respective party or parties, may or may not be eligible for listing in the NRHP. These sites may also be considered traditional cultural property (TCP). Therefore, by definition, these significance criteria only apply to cultural resources that are historic properties, significant sites of religious and/or cultural significance, or TCPs. For the purposes of brevity, the term "historic property" is used here to refer to either historic properties, significant sites of religious and/or cultural significance, or TCPs.

### 12.3. REFERENCES

- NPS (U.S. National Park Service). 1983. *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines [As Amended and Annotated]* Accessed: September 24, 2015. Retrieved from: [http://www.nps.gov/history/local-law/arch\\_stnds\\_0.htm](http://www.nps.gov/history/local-law/arch_stnds_0.htm)
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- USFWS and NMFS (U.S. Fish and Wildlife Service and National Marine Fisheries Service). 1998. *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act*. March 1998. Retrieved from: [https://www.fws.gov/ENDANGERED/esa-library/pdf/esa\\_section7\\_handbook.pdf](https://www.fws.gov/ENDANGERED/esa-library/pdf/esa_section7_handbook.pdf)