

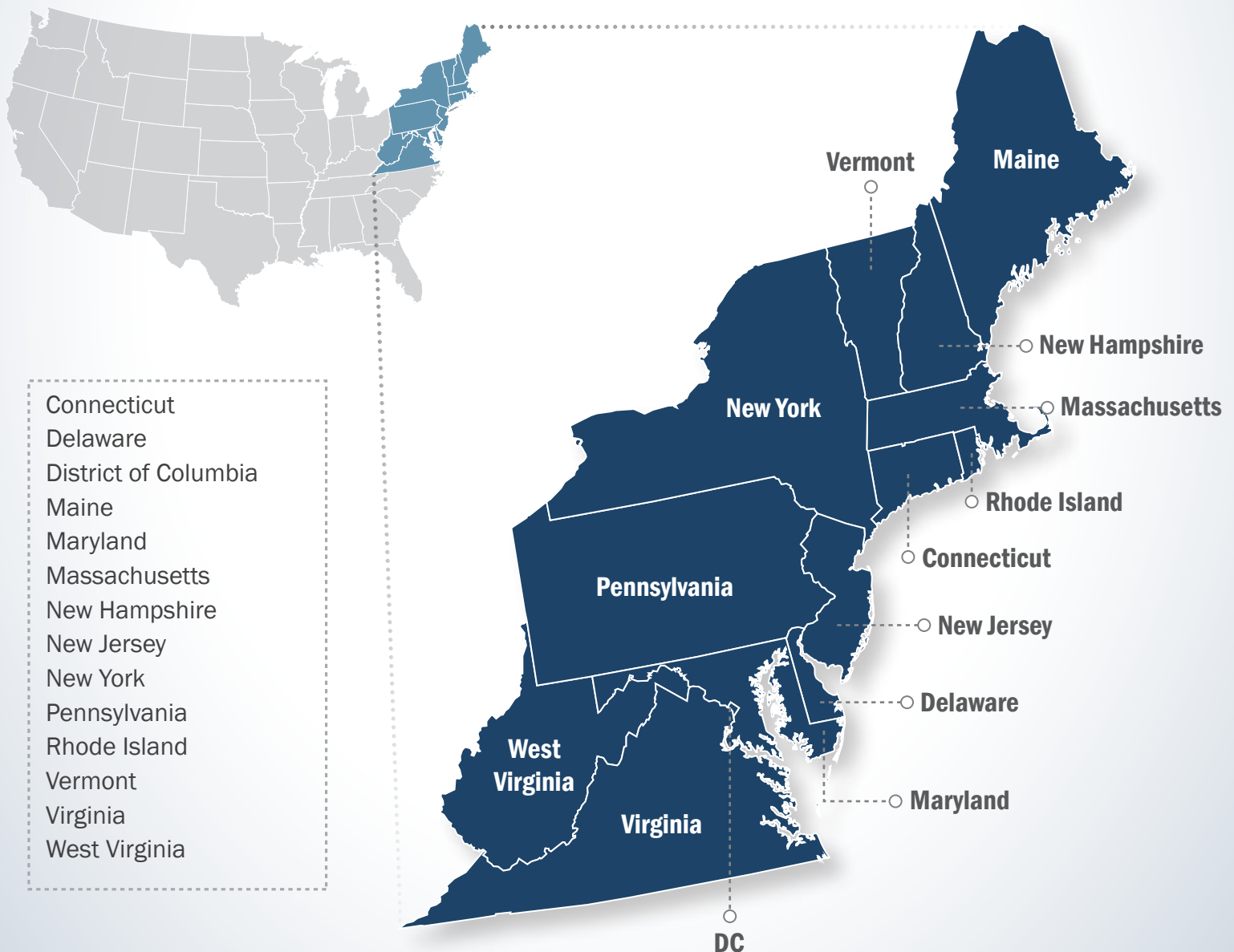


Nationwide Public Safety Broadband Network

Draft Programmatic Environmental Impact Statement

for the Eastern United States

VOLUME 15 - CHAPTER 17



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First Responder Network Authority



Nationwide Public Safety Broadband Network **Draft Programmatic Environmental Impact Statement for the Eastern United States**

VOLUME 15 - CHAPTER 17

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Cooperating Agencies

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

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Contents

17. Best Management Practices and Mitigation Measures	17-3
17.1. Infrastructure	17-3
17.2. Soils	17-4
17.3. Geology	17-6
17.4. Water Resources	17-7
17.5. Wetlands	17-9
17.6. Biological Resources	17-12
17.7. Land Use, Recreation, and Airspace	17-24
17.8. Visual Resources	17-26
17.9. Socioeconomics	17-27
17.10. Environmental Justice	17-28
17.11. Cultural Resources	17-29
17.12. Air Quality	17-30
17.13. Noise	17-32
17.14. Climate Change	17-33
17.15. Human Health and Safety	17-34
References	17-37

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17. BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

Each of the state chapters includes descriptions of the affected environment and potential environmental impacts (beneficial or adverse) resulting from the Proposed Action and Alternatives. For those impacts identified as potentially significant, best management practices (BMPs) and mitigation measures may reduce the significance to less than significant. To minimize the potential impacts of the deployment and operation of the NPSBN, FirstNet and/or its partners will require, as practicable or feasible, BMPs and mitigation measures that could avoid or minimize potential impacts. This chapter identifies BMPs and mitigation measures by resource area, with state-specific recommendations where appropriate.

17.1. INFRASTRUCTURE

17.1.1. BMPs and Mitigation Measures for All Project Types

This section describes BMPs and mitigation measures to address potential impacts to infrastructure resources. Based on the analyses of proposed activities in Chapters 3 through 16, the potential activities associated with the deployment and operation of the Proposed Action and alternatives are expected to have less than significant impacts. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for construction on or near public roads;
- Follow all applicable federal, state, and local laws concerning traffic speed and safety during the transport of equipment;
- Avoid roads with heavy traffic volumes and during peak travel hours, to the extent possible, when scheduling the transport of heavy equipment or construction materials;
- Schedule deployment activities outside of peak traffic hours;
- Design staging areas to minimize unnecessary equipment and material mobilizations;
- Repave and restore disturbed roads and public road rights-of-way (ROWs), in accordance with federal, state, and local laws, as quickly as possible so as to not create any traffic impediments that hinder access to local public safety and emergency facilities and to allow traffic capacity and safety conditions to return to their pre-construction condition;
- Design new deployment activities within ROWs, to the extent possible, and outside of roadways and thoroughfares to minimize potential impacts on traffic flow or safety;
- Coordinate closely with public safety officials, emergency and medical facilities, and existing telecommunications providers so that each is aware of the deployment activities and schedule;
- Schedule new construction outside of seasons known to cause more accidents (e.g., hurricane or winter storm seasons or times of the year when wildfires are more likely to occur) to minimize the potential for impact associated with unforeseen service disruptions during deployment activities;

- Confirm or otherwise install detection systems so that if and when a disruption to utility services or telecommunications systems occurs, it is identified and can be repaired quickly;
- Implement a backup telecommunications system, as needed, which allows first responders to communicate during deployment activities until the new nationwide public safety broadband network (NPSBN) has been successfully implemented;
- Complete deployment activities as quickly and safely as possible to avoid any possible disruptions to utility services;
- Complete deployment activities that could interrupt power during times when people are less likely to use power or water;
- Follow all applicable federal, state, or local requirements regarding utilities (water, sewer, power, and electricity) and construction within a utility ROW as to not exceed any acceptable limits; and
- Follow all applicable state and local one-call¹ laws and procedures for buildouts.

17.1.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

17.2. SOILS

17.2.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include potential construction-related impacts to soil resources resulting from ground disturbance activities. Based on the analyses in Chapters 3 through 16, potential impacts from the proposed activities would be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all applicable federal, state and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize erosion and sedimentation and restore disturbed soil;
- Minimize soil disturbance to the extent practicable;²
- Avoid construction in areas with steep (greater than 20 percent) or unstable slopes with soils known to be particularly susceptible to soil erosion and construct facilities in alternate locations if practical;
- Develop a soil erosion and sedimentation control plan for disturbed areas, and implement BMPs and mitigation measures including the use of silt fences, fiber rolls, gravel bag berms, erosion control blankets,³ retention ponds, straw and sandbag barriers, and other controls as needed to reduce soil erosion, stormwater runoff, and sedimentation;

¹ “One call” refers to the use of a single phone call to notify the utilities in the area of impending excavation activities. Often the utilities will go to the site and mark their lines (either with flags or paint) so that the excavation can avoid, if possible, damaging the utility equipment or disrupting service.

² See Section 17.5, Wetlands, for a discussion of BMPs and mitigation measures in wetlands.

³ Silt fences are designed to trap sediment in the area where construction or soil disturbance is taking place to minimize or avoid soil erosion and sedimentation. They are often 2- to 3-feet tall and are buried 8 to 12 inches into the soil with stakes. Erosion

- Schedule construction activities to avoid, to the extent possible, movement of heavy equipment across land surfaces immediately following heavy rainfall;
- Minimize the area of bare soil at any one time as much as possible by constructing in stages;
- Revegetate disturbed areas as progressively and quickly as practicable to achieve stabilization;⁴
- For areas requiring plowing, remove and store topsoil with a woven weed barrier or similar material for post-construction site restoration;
- To the extent possible, avoid construction activities immediately following heavy precipitation events, or cover exposed areas with tarps or similar materials to prevent exposure;
- Avoid areas identified as having soils that are vulnerable to compaction; select alternate locations to construct facilities if practical. All vehicles should stay on existing roads or previously disturbed areas to the maximum extent practicable;
- Use deep tillage procedures where practical to loosen compacted soils;
- Restore soil surface to original or improved contours;
- Segregate topsoil to avoid topsoil compaction;
- Use timber mats or similar infrastructure, as deemed necessary, to distribute vehicle and heavy equipment weight;
- Minimize soil disturbance to the extent practicable, especially in wetland and designated natural resource areas;
- Segregate topsoil or surface soil from subsurface layers during construction;⁵
- Implement temporary topsoil storage areas;
- Identify and maintain topsoil;
- Replace topsoil as soon as possible following construction;
- Avoid construction activities resulting in soil disturbance during periods or months with heavy rainfall and snowmelt⁶, to the extent possible; and
- Pay particular attention to areas identified as having soils that are vulnerable to compaction (see Affected Environment Soils sections) and select alternate locations to construct facilities if practical.

17.2.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for soils beyond those listed above for all project types.

control blankets are biodegradable or synthetic sheet-like materials that are rolled out onto disturbed areas to protect soil from wind and water erosion.

⁴ Plant roots play a significant role in stabilizing soils. Seeding disturbed areas quickly after construction activities would allow for faster plant and root development and would therefore provide better erosion protection.

⁵ Topsoil is segregated from subsoil layers by stripping the uppermost soil from the area being excavated and storing it separately from the subsurface soil. Once construction is completed, the topsoil is replaced as the uppermost soil unit.

⁶ See Affected Environment Climate Change sections for an explanation of seasonal climate and weather patterns.

17.3. GEOLOGY

17.3.1. BMPs and Mitigation Measures for All Project Types

Environmental concerns regarding geology can be viewed as two distinct types, those that would potentially result in impacts to the project, such as seismic hazards, landslides, and volcanic activity, and those that would potentially be impacts from the project, such as land subsidence, mineral and fossil fuel resources, paleontological resources, and impacts to resources such as surface geology, bedrock, topography, physiography, and geomorphology. Based on the analyses in Chapters 3 through 16, impacts associated with deployment or operational activities are anticipated to have less than significant impacts to geology. For those areas with the potential to encounter geologic hazards, FirstNet and/or its partners would require, as practicable or feasible, the BMPs and mitigation measures listed below, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for construction codes, seismic criteria, and geotechnical designs;
- Locate construction/deployment activities outside of high risk seismic hazard zones, active faults, and away from low coastal areas;
- Avoid construction in seismically active areas, locations with karst topography or that have shown recent subsidence, or steep or unstable slopes that are susceptible to erosion; construct facilities in alternate locations if practical;
- Avoid, to the extent practicable, deployment in areas that undergo significant geomorphological changes, such as within streams and rivers;
- Design and deploy resilient infrastructure to withstand earthquakes typical to the region;
- Construct all infrastructure to standards that meet or exceed state seismic requirements;
- Locate construction/deployment activities away from steep slopes with unconsolidated material and other areas prone to landslides, to the extent practicable; and
- Locate construction/deployment activities outside of areas identified as having karst topography, loosely compacted soils, and low density sediments prone to subsidence or compaction, to the extent practicable.

For those areas with the potential to encounter mineral or fossil fuel resources, or paleontological resources, or impact surface geology, bedrock, topography, physiography, and geomorphology, FirstNet and/or its partners would require, as practicable or feasible, the BMPs and mitigation measures listed below, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for mineral, fossil fuel, and paleontological resources;
- Avoid rock ripping to the extent practicable to preserve bedrock resources, topography, and physiography;
- Minimize the area/volume of disturbed/removed terrain during deployment/construction;
- Avoid areas with significant fossil resources, if practicable;
- Monitor deployment/construction activities and salvage fossils if areas with significant fossil resources cannot be avoided, to the extent practicable and in accordance with applicable laws and regulations;

- If paleontological resources are encountered on a project construction site, suspend all work until a certified paleontologist has been brought on-site to oversee project activities and ensure that fossil resources are handled properly;
- Limit construction to areas that are not actively mined or undergoing mineral or other material or petroleum extraction activities, or coordinate deployment with mining and extraction activities (both existing and planned) in active areas;
- Restore topographic features and grades to pre-construction/deployment conditions; and
- Develop a Paleontological Monitoring and Mitigation Plan outlining areas with high likelihood for encountering significant fossil resources and plans for avoidance and appropriate response if previously unknown resources are encountered.

17.3.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for geology beyond those listed above for all project types.

17.4. WATER RESOURCES

17.4.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include potential deployment-related and operation-related impacts to water resources resulting from ground disturbance activities, such as an increase in erosion or sedimentation near construction and staging areas. Based on the analyses in Chapters 3 through 16, potential impacts to water resources from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Minimize ground disturbance in or near waterbodies during construction, as practicable, particularly in areas prone to erosion;
- Follow all applicable federal, state, and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize introduction of eroded materials into waterbodies;
- Development of a stormwater pollution prevention plan (SWPPP);
- Include engineered or site designed methods to control stormwater;
- For large-scale construction activities, implement stormwater reduction methods, including minimizing impervious surfaces, using porous materials, or collecting and reusing stormwater (e.g., extended detention ponds, stormwater wetlands, filtration structures,⁷ and infiltration [or recharge] basins⁸);

⁷ Stormwater filtration structures use a filtering media (sand, soil, gravel, peat, or compost) to remove pollutants from stormwater runoff.

⁸ Infiltration basins (also known as recharge basins) are considered a treatment BMP because they can remove pollutants from surface discharges by capturing the stormwater runoff volume (typically, larger volumes than an infiltration trench) and infiltrating it directly to the soil rather than discharging it to an aboveground drainage system.

- For large-scale construction activities, direct water to stormwater drains, or to constructed bioretention⁹, rain garden, or other storage and retention areas designed to slow water and allow sediments to settle out;
- Minimize the total area of bare soil at any one time as much as possible by constructing in stages;
- Minimize clearing of riparian and streamside vegetation, as practicable;
- Establish and clearly mark all waterbody buffers in the field with signs or highly visible flagging until construction-related ground disturbing activities are complete;
- Stabilize and revegetate disturbed areas as progressively and quickly as practicable;
- Place materials storage and staging areas outside of waterways and floodplains, as practicable;
- Avoid construction of roads and other impervious surfaces in floodplain areas to the extent practicable, and where necessary in floodplains, construct roads and other impervious surfaces level with existing grades, as practicable, to not change or restrict water flow;
- Station all deployables and aboveground structures outside of the 100-year floodplain, to the extent practicable. If deployables or aboveground structures must be placed in 100-year floodplains, station them such that they are not vulnerable to be damaged by flood flows and do not themselves impede or restrict flood flows, as practicable;
- Restore native vegetation/wetlands to stabilize streambanks and stop erosion;
- Ensure any development proposed in a floodway or floodplain meets or exceeds state or local regulations;
- Avoid construction, where feasible, in areas with steep or unstable slopes with soils known to be particularly susceptible to soil erosion and construct facilities in alternate locations if practical;
- Develop a soil erosion and sedimentation control plan for disturbed areas, and implement BMPs, as appropriate, including the use of silt fences, erosion control blankets, and other controls as needed to reduce soil erosion, stormwater runoff, and sedimentation;
- Avoid construction activities (especially activities resulting in soil disturbance), to the extent possible, during rainy or snowmelt seasons when streamflow, rainfall, and runoff are highest;
- Monitor site restoration following ground disturbance activities, as required by law or permit; implement contingency measures if site restoration should fail and soil erosion occurs;
- Retain vegetative buffers, wherever possible, to prevent runoff into waterbodies;
- Minimize in-stream work to the extent practicable;
- Construct all stream crossings (roads and trenching) as close as perpendicular to the axis of the waterbody channel as engineering and routing conditions permit;
- Use standard upland construction techniques when crossing of waterbodies when they are dry or frozen and not flowing or as required by permit or law, provided that it is not likely for flow to resume during construction and prior to post-construction stabilization;
- Route the stream crossing to minimize the number of waterbody crossings where waterbodies meander or have multiple channels, as practicable;

⁹ Bioretention is a structural stormwater control measure that captures and temporarily stores stormwater runoff using soils and vegetation in shallow basins or landscaped areas to provide enhanced removal of dissolved stormwater pollutants, including nutrients, pesticides, organics, metals, and biological constituents.

- Inspect and maintain tanks and equipment containing oil, fuel, or chemicals for drips or leaks to prevent spills to the ground or directly into waterbodies;
- Maintain and repair all equipment and vehicles on impervious surfaces, as practicable, away from all sources of surface water;
- Park vehicles at least 50 feet from any stream or wetland unless authorized by a permit or on an existing roadway, as practicable;
- Deposit and stabilize all excavated material not reused in an upland area outside of floodplains and streams;
- Design any structures located in floodplains, as feasible, with structural hardening to withstand flooding and to not increase the risk of flooding for other areas of the floodplain;
- Properly space and size culverts in accordance with federal, state or local regulations;
- Stabilize approaches to streams and stream crossings with clean rock or steel plates during construction to minimize erosion and sedimentation, as practicable;
- Do not permit underwater blasting and pile driving activities in any water body.
- Place materials storage and staging areas outside of waterways and floodplains;
- Deposit and stabilize all excavated material not reused in an upland area outside of floodplains and streams; and
- If in-stream construction (trenching or roads) must be conducted during times that streams have flow, maintain adequate waterbody flow rates to protect aquatic life, and prevent the interruption of existing downstream users, as practicable.

17.4.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for water resources beyond those listed above for all project types.

17.5. WETLANDS

17.5.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include potential deployment- and operation-related impacts to wetlands resulting from ground disturbance activities. Based on the analyses in Chapters 3 through 16 the deployment and operational activities are expected to have less than significant impacts on wetlands. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements related to potential wetland impacts and permitting to avoid or minimize potential wetland impacts, compensate for unavoidable impacts to wetlands, and restore impacted wetlands;
- Follow all BMPs and mitigation measures related to minimizing soil erosion, sedimentation, and soil compaction presented in Section 17.2, Soils;
- Conduct a detailed baseline study of the wetland to be impacted, if impacts to a specific wetland are unavoidable, to aid in restoration of pre-impact condition, including, as

appropriate or required by law, a survey of wetland contours; soil texture and profile; plant species, structure, and cover; and hydrology;

- Develop a SWPPP;
- Ensure that soil erosion and sediment controls are properly installed and maintained;
- Clearly mark the boundaries of wetland areas to be avoided during construction using flagging, and maintain markers until reclamation is complete (as applicable). Train equipment operators on the activities to avoid within or near wetlands;
- Segregate and salvage all topsoil up to a maximum of 12 inches of topsoil from the area disturbed in dry wetlands, where practicable, and restore topsoil to its approximate original stratum after backfilling is complete;
- Avoid temporarily storing or stockpiling materials in wetland areas or in areas that could alter wetland hydrology (causing damming and flooding) or impede or divert water (causing drying). When unavoidable, place temporary fill on geotextile fabric;
- Minimize vegetation clearing in or near wetlands. If vegetation clearing is required, minimize ground disturbance and maintain low groundcover vegetation, as well as the roots of taller vegetation;
- When construction is unavoidable, time construction to outside the breeding and migratory seasons of wetland wildlife;
- When construction is unavoidable, time construction activities to the low flow period, as defined by the USACE general permit, or to when the soil is frozen;
- Preserve existing tree canopies and natural areas in and around wetlands as much as possible;
- When cutting wetland vegetation is unavoidable, complete the work by hand (chain or hand saw) instead of using large equipment;
- Use timber mats when working in or near wetlands;
- Avoid both above and belowground wetland crossings;
- When crossing a wetland is unavoidable, take advantage of already disturbed areas such as easements, roads, roadway shoulders, bridges, or old railroad beds;
- Consider spanning a wetland by locating telecommunication poles on either side of the wetland, instead of disturbing the interior;
- Avoid diversion of surface water and groundwater sources, which could affect nearby wetlands;
- Prohibit use of herbicides or pesticides within 100 feet of any wetland (unless allowed or required by the appropriate land management, tribal, or federal, state, or local agency);
- Conduct post-construction monitoring inspections after the first growing season to determine success of revegetation, as applicable, unless otherwise required by a permit;
- Include engineered or site designed methods to control stormwater;
- Create and maintain buffer zones around wetlands to protect their functions and values;
- Develop management plans such as, but not limited to, wetland and vegetation management and restoration, water quality protection, and erosion and sediment control plans for the management of wetland habitat, vegetation, water quality, and soils/erosion control;
- Follow any BMPs and mitigation measures for work in or near wetlands developed by federal, state and local agencies, such as state departments of transportation;

- Position deployment activities to avoid wetlands to the greatest extent practicable and to minimize the project footprint while safely and practically implementing the Proposed Action;
- Install and maintain sediment barriers, as appropriate, at saturated wetlands or wetlands with standing water across the entire construction ROW upslope of the wetland boundary and where saturated wetlands or wetlands with standing water are adjacent to the construction ROW as necessary to prevent sediment flow into the wetland;
- When construction within wetlands is unavoidable, time use of heavy equipment to avoid periods of heavy moisture, as appropriate;
- Where practicable, do not maintain, store, wash, or repair equipment in or near (within 100 feet of) wetland areas to avoid spills or contamination;
- Where practicable, do not use heavy equipment within wetlands, even temporarily, and do not travel through wetlands;
- Use wide-tracked, or low-ground pressure construction equipment and/or conventional equipment operating from the ROW, timber mats, or prefabricated equipment mats. Prohibit storage of hazardous materials, chemicals, fuels, and lubricating oils in wetlands. Use existing access roads whenever possible;
- Where construction is required, maintain natural drainage patterns to the extent practicable by installing culverts in sufficient number and size to prevent ponding, diversion, or concentrated runoff;
- Use gravel for road surfaces where possible to avoid an increase in permeable surfaces and use proper drainage structures to minimize sedimentation and erosion to adjacent wetlands;
- Consult local wetland restoration guidance, including communicating with local agency and other wetland and restoration scientists. Use suggested up-to-date published restoration manuals to ensure that appropriate wetland restoration measures are followed and to increase restoration success;
- In areas where wetlands would be restored, stockpile wetland topsoil and sod mats removed during installation using standard reclamation protocol. Re-use the topsoil and sod mats in the post-construction wetland restoration;
- Revegetate, as applicable, bare areas as progressively and quickly as possible (preferably within the same growing season) to stabilize soils, reduce sedimentation, and avoid the spread of invasive species. Install erosion protection and leave in place until the area is revegetated and the soil is stabilized; and
- Determine restoration to be successful if the surface condition is similar to adjacent undisturbed communities or found acceptable by the applicable regulatory body.

17.5.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply to Wired Projects in addition to those listed above for all project types:

- New Build – Buried Fiber Optic Plant
 - Avoid, as appropriate, stockpiling material from directional drilling in a wetland, or where the stockpile could cause sedimentation into a wetland or dam water, causing

- flooding of a wetland area; avoid, as appropriate, setting up drilling equipment in a wetland;
- o Conduct dewatering in a manner to prevent erosion and to prevent heavily silt-laden water from flowing directly into any wetland or waterbody if dewatering an excavation;
- o Replace topsoil and restore original contours to the greatest extent practicable;
- o Install buried cable along existing road ROWs wherever possible to minimize vegetation clearing and other potential impacts to wetlands; and
- o Use structures or devices to prevent subdrainage or groundwater movement along new trenched-in buried conduit such as anti-seepage collars, intermittent clay barriers, trench plugs, or clay saddles.
- New Build – Aerial Fiber Optic Plant
 - o Install overhead transmission lines along existing road ROWs wherever possible to minimize vegetation clearing and other potential impacts to wetlands.
- New Build – Submarine Fiber Optic Plant
 - o Avoid, as appropriate, stockpiling material from directional drilling in a wetland, or where the stockpile could cause sedimentation into a wetland or dam water, causing flooding of a wetland area; avoid, as appropriate, setting up drilling equipment in a wetland; and
 - o Conduct dewatering in a manner that prevents erosion and prevents heavily silt-laden water from flowing directly into any wetland or waterbody if dewatering an excavation.

17.6. BIOLOGICAL RESOURCES

The potential for impacts to biological resources, including terrestrial vegetation, wildlife, fisheries and aquatic habitats, and threatened or endangered species, could occur through activities such as land clearing, excavation activities, construction, or operation of ground-based and aerial vehicles. Based on the analyses in Chapters 3 through 16, impacts to biological resources associated with deployment and operation of the Proposed Action are expected to be less than significant; however, potential impacts to threatened and endangered species are expected to be less than significant with the incorporation of BMPs and mitigation measures.

17.6.1. Terrestrial Vegetation

17.6.1.1. *BMPs and Mitigation Measures for All Project Types*

FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts to terrestrial vegetation:

- Engage in early consultation with appropriate agencies and stakeholders, including but not limited to the U.S. Fish and Wildlife Service (USFWS) and state agencies;
- Follow all applicable federal, state, and local requirements for vegetation removal, disturbance, and restoration;

- Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practicable;
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce vegetation loss;
- Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles before moving from one deployment site to another;
- Identify all areas within the proposed construction footprint that contain noxious or invasive plants and use pre-construction treatments such as mowing or herbicide applications (in consultation with appropriate agencies and stakeholders) prior to ground disturbance activities;
- Minimize land clearing and vegetation disturbance by using existing roads and unvegetated areas, when feasible, during deployment activities;
- Restore disturbed areas as progressively and quickly as possible to pre-construction use and vegetation cover using appropriate and certified seed mixes and seed dispersal, management, and maintenance processes, as applicable;
- Minimize or avoid removal of forest vegetation whenever possible;
- Obtain all appropriate permits and comply with permit conditions to minimize or avoid impacts to vegetation;
- Revegetate disturbed areas as progressively and proactively as possible to minimize impacts associated with vegetation loss;
- Segregate topsoil or surface soil from subsurface layers during construction for reuse during post-construction seeding;
- Store soil containing noxious or invasive plants awaiting proper disposal, in a location away from clean topsoil and subsoil;
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss and habitat fragmentation;
- Inspect and clean all construction equipment and deployable vehicles on an impervious surface with high-pressure washing equipment to remove soil and plant matter prior to moving to the next job site or staging location;
- Limit construction equipment and vehicles to approved roads or ROWs;
- Use existing roads and regularly maintained areas when conducting routine maintenance and inspections to the extent feasible; and
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts

17.6.1.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for terrestrial vegetation beyond those listed above for all project types.

17.6.2. Wildlife

17.6.2.1. *BMPs and Mitigation Measures for All Project Types*

FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts to wildlife:

- Engage in early consultation with appropriate agencies and stakeholders as necessary, including but not limited to USFWS, the NMFS, and other relevant federal or state agencies;
- Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) (APLIC and USFWS, 2005) for any aboveground lines or cables (e.g., use of diverters);
- Implement seasonal and spatial buffer zones around sensitive areas for deployment and maintenance activities, where possible, as recommended by USFWS and state wildlife and natural resources agencies;
- Implement the National Bald Eagle Management Guidelines (USFWS, 2007);
- Assess locations of roost sites for bats and timing of critical life stages (e.g., maternity and weaning periods) and hibernation for deployment and associated activities (these times vary greatly depending on region, species, and habitat);
- Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practical;
- Avoid Important Bird Areas (IBAs) and other known important bird habitats to the maximum extent practicable;
- Minimize or avoid the need for or use of sodium vapor lights at site facilities to reduce attraction of migratory birds;
- Turn off all unnecessary lighting at night;
- Install anti-perching or nesting devices on existing or new structures;
- Avoid known marine mammal haulouts or concentration areas for deployment and associated activities;
- Assess critical life stages of marine mammals in haulouts within 1 mile of deployment and associated activities;
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce potential habitat loss;
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss and habitat fragmentation;
- Control the spread of invasive animals and plants by inspecting and cleaning equipment and vehicles before moving from one deployment site to another, coordinating mowing schedules and assisting agencies and groups with ROW permits, washing mowers and equipment between sites, and educating staff;
- Develop “good housekeeping” procedures to ensure that sites would be kept clean of debris, garbage, and fugitive trash or waste during operation;
- Develop monitoring programs and adaptive management strategies;

- Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship, lambing/calving, pupping and molting [haulout period], spring/fall migrations) seasons;
- Locate project activities, facilities, and roads away from key habitats (e.g., wetlands, cays¹⁰, and stream sites) for amphibians and reptiles;
- Minimize herbicide and pesticide use during maintenance activities to the extent possible;
- Minimize vehicular harm of animals migrating between seasonal habitats by locating activities, roads, and infrastructure away from these areas or installing barriers along roadsides;
- Do not permit pets on site in order to avoid harassment and disturbance of wildlife;
- Follow food and waste management protocols to minimize attractants to proposed network deployment sites;
- Report observations of potential wildlife interactions, including wildlife mortality, to the appropriate agency immediately;
- Segregate topsoil or surface soil from subsurface layers during construction for reuse during post-construction seeding;
- Store soil containing noxious or invasive plants that are awaiting proper disposal in a location away from clean topsoil and subsoil;
- Use existing roads and regularly maintained areas when conducting routine maintenance and inspections to the extent feasible;
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts;
- Limit construction equipment and vehicles to approved roads or ROWs;

17.6.2.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wired Projects
 - New Build – Aerial Fiber Optic Plant
 - Install bat exclusions on existing and new structures.
- Wireless Projects
 - New Wireless Communication Towers
 - Follow guidelines outlined by USFWS for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS, 2013a):
“1. Collocation of the communications equipment on an existing communication tower or other structure (e.g., billboard, water and transmission tower, distribution pole, or building mount) is strongly recommended. Depending on tower load factors and communication needs, anywhere from 6 to 10 providers should collocate on an existing

¹⁰ Cays are small, low-elevation, sandy islands on the surface of a coral reef.

tower or structure, provided that frequencies do not overlap/‘bleed’ or where frequency length or broadcast distance requires higher towers. New towers should be designed structurally and electronically to accommodate the applicant’s antenna, and antennas of at least two additional users—ideally six to 10 additional users, if possible—unless the design would require the addition of lights and/or guy wires to an otherwise unlit and/or un-guyed tower. This recommendation is intended to reduce the number of towers needed in the future.

2. If collocation is not feasible and a new tower or towers are to be constructed, it is strongly recommended that the new tower(s) should be not more than 199 feet aboveground level (AGL), and that construction techniques should not require guy wires. Such towers should be unlighted if Federal Aviation Administration (FAA) regulations and lighting standards permit (FAA, 2007) (Patterson, J., 2012)¹¹). Additionally, the Federal Communications Commission (FCC), through recent rulemaking, now requires that new towers > 450 ft AGL contain no red-steady lights. FCC also recommends that new towers 350-450 ft AGL also contain no red-steady lights, and they will eventually recommend that new towers < 350 ft AGL convert non-flashing lights to flash with existing flashing lights. LED lights are being suggested as replacements for all new construction and for retrofits, with the intent of future synchronizing of the flashes. Given these dynamics, the Service recommends using lattice tower or monopole structures for all towers < 200 ft AGL and for taller towers where feasible. The Service considers the less than 200 ft AGL option the ‘gold standard’ and suggests that this is the environmentally preferred industry standard for tower placement, construction, and operation—i.e., towers that are unlit, un-guyed, monopole or lattice, and less than 200 ft AGL.

3. If constructing multiple towers, the cumulative impacts of all the towers to migratory birds—especially to Birds of Conservation Concern (USFWS, 2008) and threatened and endangered species, as well as the impacts of each individual tower, should be considered during the development of a project.

4. The topography of the proposed tower site and surrounding habitat should be clearly noted, especially in regard to surrounding hills, mountains, mountain passes, ridge lines, rivers, lakes, wetlands, and other habitat types used by raptors, Birds of Conservation Concern, state and federally listed species, and other birds of concern. Active raptor nests, especially those of Bald and Golden Eagles, should be noted, including known or suspected distances from proposed tower sites to nest locations. Nest site locations for Golden Eagles may vary between years, and unoccupied, inactive nests and nest sites may be re-occupied over multiple years. The Service’s 2013 Eagle Conservation Plan Guidance, Module 1,

¹¹ Current FAA guidance (USFWS, 2012) requires lighting for towers greater than 200 feet.

Land-based Wind Energy, Version 2, available on our website, is a useful document (USFWS, 2013b).

5. If at all possible, new towers should be sited within existing ‘antenna farms’ (i.e., clusters of towers), in degraded areas (e.g., strip mines or other heavily industrialized areas), in commercial agricultural lands, in Superfund sites, or other areas where bird habitat is poor or marginal. Towers should not be sited in or near wetlands, other known bird concentration areas (e.g., state of federal refuges, staging areas, rookeries, and Important Bird Areas), in known migratory, daily movement flyways, areas of breeding concentration, in habitat of threatened or endangered species, or key habitats for Birds of Conservation Concern (USFWS, 2008). Disturbance can result in effects to bird populations which may cumulatively affect their survival. The Service has recommended some disturbance-free buffers, e.g., 0.5 mi around raptor nests during the nesting season, and 1-mi disturbance free buffers for Ferruginous Hawks and Bald Eagles during nesting season in Wyoming ([US]FWS WY Ecological Services Field Office, referenced in Manville 2007:23). The effects of towers on ‘prairie grouse,’ ‘sage grouse,’ and grassland and shrub-steppe bird species should also be considered since tall structures have been shown to result in abandonment of nest site areas and leks, especially for ‘prairie grouse’ (Manville, A., 2004). The issue of buffers is currently under review, especially for Bald and Golden Eagles. Additionally, towers should not be sited in areas with a high incidence of fog, mist, and low cloud ceilings.

6. If taller (> 199 ft AGL) towers requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used.^[12] Unless otherwise required by the FAA, only white strobe or red strobe lights (red preferable since it is generally less displeasing to the human eye at night), or red flashing incandescent lights should be used at night, and these should be the minimum number, minimum intensity (< 2,000 candela), and minimum number of flashes per minute (i.e., longest duration between flashes/‘dark phase’) allowable by the FAA. The use of solid (non-flashing) warning lights at night should be avoided (Patterson, J., 2012) (Gehring et al., 2009)—see recommendation #2 above. Current research indicates that solid red lights attract night-migrating birds at a much higher rate than flashing lights (Gehring et al., 2009) (Manville, A., 2009). Recent research indicates that use of white strobe, red strobe, or red flashing lights alone provides significant reductions in bird fatalities (Patterson, J., 2012) (Gehring et al., 2009).

7. Tower designs using guy wires for support, which are proposed to be located in known raptor or waterbird concentrations areas, daily movement routes, major diurnal migratory bird movement routes, staging

¹² This guidance (USFWS, 2013a) was based on earlier FAA guidance that has since been updated. Current FAA guidance (FAA 2015) now requires lighting for towers greater than 200 feet.

areas, or stopover sites, should have daytime visual markers or bird deterrent devices installed on the wires to prevent collisions by these diurnally moving species. The efficacy of bird deterrents on guy wires to alert night migrating species has yet to be scientifically validated. For guidance on markers, see Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines -- State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, DC, and Sacramento, CA. 207 pp, and APLIC. 2012. Reducing Avian Collisions with Power Lines -- the State of the Art in 2012. Edison Electric Institute and APLIC. Washington, DC. 159 pp. Also see www.aplic.org, www.energy.ca.gov, or call 202-508-5000.

8. Towers and appendant facilities should be designed, sited, and constructed so as to avoid or minimize habitat loss within and adjacent to the tower 'footprint.' However, a larger tower footprint is preferable to the use of guy wires in construction. Several shorter, un-guyed towers are preferable to one tall guyed, lighted tower. Road access and fencing should be minimized to reduce or prevent habitat fragmentation, disturbance, the creation of barriers, and to reduce aboveground obstacles to birds in flight.

9. If it has been determined prior to tower design, siting and construction that a significant number of breeding, feeding and roosting birds—especially Birds of Conservation Concern (USFWS, 2008), state or federally-listed bird species, and eagles—are known to habitually use the proposed tower construction area, relocation to an alternate site is highly recommended. If this is not an option, seasonal restrictions on construction are advised in order to avoid disturbance, site and nest abandonment, especially during breeding, rearing and other periods of high bird activity.

10. Security lighting for on-ground facilities, equipment and infrastructure should be motion- or heat-sensitive, down-shielded, and of a minimum intensity to reduce nighttime bird attraction and eliminate constant nighttime illumination, while still allowing safe nighttime access to the site (USFWS 2012[b], Manville 2011).

11. Representatives from the USFWS or researchers from the Research Subcommittee of the Communication Tower Working Group should be allowed access to the site to evaluate bird use; conduct dead-bird searches; place aboveground net catchments below the towers (Manville 2002); and to perform studies using radar, Global Position System, infrared, thermal imagery, and acoustical monitoring, as necessary. This will allow for assessment and verification of bird movements, site use, avoidance, and mortality. The goal is to acquire information on the impacts of various tower types, sizes, configurations and lighting protocols.

12. Towers no longer in use, not re-licensed by the FCC for use, or determined to be obsolete should be removed from the site within 12 months of cessation of use, preferably sooner.

13. In order to obtain information on the usefulness of these guidelines in preventing bird strikes and better understanding impacts from habitat fragmentation, please advise USFWS personnel of the final location and specifications of the proposed tower, and which measures recommended in these guidelines were implemented. If any of these recommended measures cannot be implemented, please explain why they are not feasible. This will further advise USFWS in identifying any recurring problems with the implementation of the guidelines, which may necessitate future modifications.”

- Deployable Technologies
 - Avoid activities within migratory bird flyways and in the immediate vicinity of bat roosts to the extent practicable;
 - Do not operate aircraft at an altitude that could disturb known natural roosting sites of bats, with the only exception being severe weather conditions;
 - Do not operate aircraft at an altitude lower than 1,500 feet within 0.5 mile of known calving/lambing areas during critical life stages, with the exception only for severe weather conditions; and
 - Do not operate aircraft at an altitude lower than 1,500 feet within 0.5 mile of known seal haulouts observed on land, with the exception only for severe weather conditions.

17.6.3. Fisheries and Aquatic Habitats

17.6.3.1. *BMPs and Mitigation Measures for All Project Types*

FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts to fisheries and aquatic habitats:

- Engage in early consultation with appropriate agencies and stakeholders, including but not limited to USFWS, NMFS, and other relevant federal or state wildlife and natural resources agencies;
- Follow all applicable federal and state requirements for construction activities near/in fish and fish habitat;
- Establish buffers around sensitive areas (e.g., nesting sites, wetlands);
- Avoid construction, as practicable, during sensitive seasons for fish such as migration, spawning, egg development (including intra-gravel development) and larval fish (benthic or pelagic¹³) development (sensitive seasons/time periods vary by species and location);
- Avoid construction/deployment, as practicable, in productive riparian zones, marine preserves, and wetlands since construction could potentially result in less refuge for fish,

¹³ Inhabiting the water column as opposed to being associated with the sea floor; generally occurring anywhere from the surface to 1,000 meters (NOAA 2006)

fundamental changes in channel structure (e.g., loss of pool habitats), instability of stream banks, and alteration of nutrient and prey sources within the shoreline aquatic community (Hanson et al. 2003);

- Avoid physical barriers in waterbodies, to the extent practicable, during installation and operation to allow for the migration of invertebrates and other aquatic fauna;
- Avoid productive habitats to the extent practicable, such as coastal wetlands, inland waterways, essential fish habitats, spawning areas, and reefs;
- Consolidate facilities as much as possible;
- Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles before moving from one deployment site to another;
- Implement an emergency response plan for fuel spills and environmental emergencies;
- Implement invasive species plans to minimize introduced aquatic plant and animal species into the Proposed Action areas (i.e., wash and inspect equipment and vehicles before moving from one drainage basin or watershed to the next);
- Include secondary containment for hazardous materials such as fuels and use uplands, as feasible, away from streams and waterbodies for refueling of construction or operations equipment;
- Instruct all construction employees to avoid harassment and disturbance of fish and other aquatic species, and report any signs of mortality to the appropriate agency immediately;
- Minimize construction noise in and near fish habitats, as practicable;
- Avoid vegetation removal or siting projects in areas with poor bank or shoreline stability to minimize the potential for erosion and sedimentation;
- Minimize sedimentation and turbidity in fish habitats by implementing sediment and erosion control measures, as practicable; the use of such measures (e.g., silt fences, silt curtains¹⁴, and erosion control blankets) could reduce erosion and sedimentation;
- Minimize the amount of fill placed in wetlands and streams when constructing access roads by installing bridges and or culverts. Use culverts and bridges that are appropriately designed and sized for fish passage;
- Revegetate and restore riparian areas and other vegetated areas around aquatic resources to the extent possible once construction activities are complete;
- Use setbacks when clearing vegetation for construction, where appropriate, from riparian zones to avoid removal of important fish cover such as vegetation boulders, and large woody debris;
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts;
- Perform regular maintenance checks of equipment near protected areas to minimize detachment of components reaching critical habitat by tidal flow; and
- Report spills or other observed pollutants to the appropriate agency immediately.

¹⁴ Silt curtains are floating barriers used in marine construction and remediation to control silt and sediment in a body of water.

17.6.3.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply to Wired Projects in addition to those listed above for all project types:

- New Build – Buried Fiber Optic Plant
 - Use horizontal directional drilling where possible and appropriate, for stream crossings to avoid potential impacts to the streambed, banks, and associated fish habitat.
- New Build – Aerial Fiber Optic Plant
 - Keep poles or lines clear of excess vegetation growth during equipment operation and non-operation periods.
- Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable
 - Keep poles or lines clear of excess vegetation growth during equipment operation and non-operation periods.

17.6.4. Threatened and Endangered Species and Species of Conservation Concern

17.6.4.1. BMPs and Mitigation Measures for All Project Types

To avoid or minimize potential effects of deployment activities to threatened and endangered species, BMPs and mitigation measures, as defined through consultation with the appropriate resource agency, would be implemented. Additional BMPs and mitigation measures, listed below, may be implemented as appropriate to further minimize potential impacts:

- Engage in early consultation with appropriate agencies and stakeholders including, but not limited to, USFWS, NMFS, and other relevant federal or state wildlife and natural resources agencies;
- Follow all applicable federal and state requirements for construction activities near/in fish and fish habitat;
- Avoid conducting deployment activities in areas with known locations or habitats for threatened and endangered plants;
- Avoid activities within seagrass beds and control turbidity to minimize potential indirect impacts on seagrass;
- Avoid potential impacts within coastal estuarine habitats;
- Use appropriate sediment and erosion control measures to minimize sedimentation and turbidity in fish habitats;
- Use setbacks from riparian zones when clearing vegetation for construction to avoid removal of important fish cover such as vegetation boulders and large woody debris;
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce potential habitat loss;

- Avoid removal or disturbance of forest vegetation to the maximum extent practicable and ensure that any unavoidable forest impacts do not result in the loss of listed snails, butterflies, bird breeding habitat, or bat roost sites or hibernacula;¹⁵
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall habitat fragmentation;
- Establish buffers around habitat areas, whenever possible, due to the limited range for some federally listed species;
- Implement seasonal and spatial buffer zones for operational activities that involve potentially disturbing activities in listed species use areas;
- Implement seasonal and spatial buffer zones for construction and other potentially disturbing activities during sensitive periods for listed species such as breeding, nesting, calving/pupping, haulout, migration, spawning, and egg development as identified by USFWS, the NMFS, and/or other relevant federal or state agencies;
- Avoid bat roosting areas, particularly maternity roost colonies, during critical life stages for deployment and associated activities (i.e., approximately April to November);
- Avoid or minimize the use of sodium vapor lights at site facilities to reduce attraction of migratory birds;
- Implement invasive species plans to minimize introduced aquatic plant and animal species into the areas affected by the Proposed Action (i.e., wash and inspect equipment and vehicles before moving from one drainage basin or watershed to the next);
- Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles on an impervious surface before moving from one deployment site to another;
- Develop and implement operational monitoring and adaptive management procedures;
- Follow food and waste management protocols to minimize attractants to the deployment site;
- Implement “good housekeeping” procedures to ensure that during operation the sites would be kept clean of debris, garbage, and fugitive trash or waste;
- Implement a strict policy prohibiting pets on site and prohibiting hunting or fishing or any other action that would result in any avoidable disturbance of listed species;
- Implement an emergency response plan for fuel spills and environmental emergencies;
- Include secondary containment for hazardous materials and use non-wetland sites away from streams and waterbodies for refueling of construction or operations equipment;
- Instruct all employees involved in construction/deployment activities to identify and report any sightings of listed species, to avoid harassment and disturbance of wildlife, and to not disturb or enter any nearby caves or mines;
- Minimize the use of coastal lighting, particularly in the vicinity of known turtle nesting areas. If the use of coastal lighting in sea turtle use areas is unavoidable, use turtle safe lighting instead of normal lights (i.e., low-pressure sodium-vapor lighting or red lights that emit a very narrow portion of the visible light spectrum) and consult with local sea turtle experts on the design of the coastal lighting plan;
- Report observations of sensitive species that are injured, dead, or entangled to the appropriate agency immediately;

¹⁵ Hibernacula are the habitats within which animals hibernate or otherwise seek refuge for extended periods.

- Train construction and deployment staff in the Proposed Action BMPs and mitigation measures and incentivize reporting of any lapses in BMP and mitigation measure implementation;
- Turn off all unnecessary lighting at night; and
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts.

17.6.4.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wired Projects
 - New Build – Aerial Fiber Optic Plant
 - Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) for any aboveground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).
 - Collocation on Existing Aerial Fiber Optic Plant
 - Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) for any aboveground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).
 - Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable
 - Minimize underwater construction noise in all aquatic habitats by minimizing vessel speed, using quieter equipment or technologies, or deploying bubble curtains or other noise screens during underwater work; and
 - Implement a marine observer program during construction and operation to avoid and minimize boat strikes
- Wireless Projects
 - New Wireless Communication Towers
 - Follow guidelines outlined by USFWS for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS, 2013a) mentioned above in “Wildlife.”
 - Collocation on Existing Wireless Tower, Structure, or Building
 - Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) for any aboveground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).

- Deployable Technologies
 - Restrict aircraft operation at altitudes lower than 1,500 feet within 0.5 mile of known pupping or haulout areas during critical life stages, with the exception only for severe weather conditions; and
 - Keep aircraft above altitudes higher than 1,500 feet within 0.5 mile of seals hauled out on land, with the exception only for severe weather conditions.

17.7. LAND USE, RECREATION, AND AIRSPACE

17.7.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include potential deployment- and operation-related impacts to land use, recreation, and airspace resulting from activities including the construction or installation of infrastructure, or deployment of deployable assets. Based on the analyses in Chapters 3 through 16 potential impacts from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Land Use
 - Follow applicable federal, state, and local land use plans and policies to ensure compatibility with existing and surrounding land uses;
 - Follow and comply with applicable existing zoning requirements to ensure compatibility with existing and surrounding land uses;
 - Contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify potentially sensitive land uses and land use issues and concerns specific to the region;
 - Sign areas, access roads, and/or easements that would require temporary closure or limited access to accommodate certain land uses;
 - Schedule construction activities, where feasible, to minimize impacts to existing and surrounding land uses;
 - Utilize existing roads, rights-of-way, easements, and utility corridors to the maximum extent feasible and to minimize the number of new access roads;
 - Give preference to development options that involve use of existing physical infrastructure, and/or that do not involve new aboveground structures (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.), especially near recreation lands;
 - Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (e.g., cut and fill) or vegetation, and that are as far from surrounding residences as possible;

- Retain existing vegetation wherever possible to provide visual screening of new infrastructure; and
- Select infrastructure designs that minimize contrast with the surrounding landscape and land uses.
- Recreation
 - Contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify recreation activities specific to the region and their respective seasons;
 - Sign areas, access roads, and/or recreation trails that would require temporary closure, limited access, or detours to accommodate certain recreation activities;
 - Schedule deployment activities, where feasible, to not interfere with seasonal recreation activities;
 - Utilize existing roads, rights-of-way, easements, and utility corridors to the maximum extent feasible and to minimize the number of new access road;
 - Complete deployment activities with minor, temporary impacts to recreation resources during periods or seasons of low use;
 - Give preference to infrastructure locations that are compatible with existing park or recreation planning documents;
 - Complete deployment activities, to the extent practicable, outside of and away from existing recreation locations, and
 - Select infrastructure locations that are as far from recreation lands as possible.
- Airspace
 - Follow all applicable federal, state, and local requirements for preservation of the airspace to avoid or minimize reducing existing capacity, decreasing safety, negatively impacting current operations, or increasing the risk to airspace users or persons and property;
 - To the extent practicable, avoid deploying and operating wired and wireless sources near airports/facilities that trigger the need for an OE/AAA by the FAA based on height and airport elevation criteria; and
 - For new construction, prepare site plans with sufficient detail to assess potential impacts to SUAs, restricted airspace, and general and military aviation.

17.7.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wireless Projects

- o New Wireless Communication Towers
 - Select the shortest possible structures necessary to meet the FirstNet system's needs, and only deploy towers less than 200 feet in height wherever possible;
 - Place new infrastructure near existing similar infrastructure where possible, to minimize the total number of new aerial navigation hazards;
 - Avoid placing new infrastructure near airports or the areas regulated under the FAA's Part 77 regulations (FAA, 2010); and
 - Avoid placing new infrastructure within Military Operations Areas or under Military Training Routes unless coordinated with the relevant military unit.
- Deployable Technologies
 - o Coordinate early with FAA on aerial deployable technologies (flying UASs and balloon launches) to establish procedures that are in place prior to the need to use these technologies during emergency response events; and
 - o Limit the use of Deployable Airborne Communications Architecture to areas less likely to be used by commercial, military, or private aviation (to the degree feasible, and in consultation with the FAA and Department of Defense).

17.8. VISUAL RESOURCES

17.8.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action could result in impacts to visual resources through the construction of towers, structures, roads, or other permanent features, as well as the installation of security or aviation lighting. Based on the analyses in Chapters 3 through 16, impacts to most visual resources associated with the deployment and operation of the Proposed Action are expected to be less than significant; however, impacts to night skies in rural areas are expected to be less than significant with the incorporation of BMPs and mitigation measures. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Proposed design should take into account the scenic character of the surrounding area to reasonably minimize or avoid visual impacts to the surrounding area when viewed from existing roadways or shorelines (design structures to complement the natural landscape; for example, use paint that blends with the surrounding landscape);
- Utilize non-reflecting coatings to towers, antennas, buildings, and associated structures where possible;
- Implement sensitive grading techniques that blend with the natural terrain;
- Treat all disturbed slopes for erosion control;
- Where appropriate, use vegetation as screens to block views of structures and roadways;
- Minimize the area of bare soil at any one time as much as possible by constructing in stages;
- Revegetate disturbed areas as progressively and quickly as practicable to restore vegetative cover;

- Reduce or eliminate the need for lighting on poles or structures, or restrict the duration and directionality of needed lighting;
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.), and specifically avoid the construction of new aerial fiber optic plant and/or new wireless communication towers within or in locations within sight of federal or other lands where visual resources are regulated (e.g., units of the National Park System, or areas where local zoning regulations emphasize protection of views or aesthetic conditions), or where residents and visitors have come to expect high visual quality and the absence of human-built structures;
- Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (i.e., cut and fill) or vegetation, and that are as far from surrounding residences as possible;
- Comply with all relevant and applicable federal, state, or local regulations and guidance regarding visual and aesthetic conditions and impacts; and
- Comply with the BMPs and mitigation measures for towers required by USFWS, as detailed in Section 17.6.2, Wildlife.

17.8.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply to Deployable Technologies in addition to those listed above for all project types:

- Select parking locations for deployable technologies that are screened from view by topography or vegetation, that are as far away from as many observers as possible, and that are not in or near areas considered scenic, such as shorelines, ridgelines, or scenic roads; and
- Select deployable designs that minimize the use of nighttime lighting, that include shielded or directional nighttime lighting, and/or that use the minimum nighttime lighting required for safe operations.

17.9. SOCIOECONOMICS

17.9.1. BMPs and Mitigation Measures for All Project Types

Implementation of the Proposed Action and alternatives could include deployment and operations activities that would involve public expenditures, construction, and related activities, all of which may influence socioeconomics depending on the deployment activity and location. Based on the analyses in Chapters 3 through 16, potential impacts from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Avoid development of new wireless communication towers in or near residential areas, in order to reduce the potential that such activities could have adverse impacts on residential property values. Acceptable distances could vary depending on the nature of the aesthetic impacts, the nature of other objectionable effects that influence property values, and other factors such as: residential density, local concern over aesthetics, desire for improved

wireless communications, local media response, and more. According to a recent literature review, measurable adverse impacts of wireless communication towers on property values are generally not observable beyond 300 meters (984 feet), and often are not observable beyond 100 meters (328 feet) (Bond, Sims, & Dent, 2013);

- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, buried, or undersea infrastructure, etc.);
- Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (i.e., cut and fill) or vegetation and that are as far from surrounding residences as possible;
- Retain existing vegetation wherever possible to provide visual screening of new infrastructure;
- Select infrastructure designs that minimize contrast with the surrounding landscape;
- Select infrastructure designs that minimize construction footprints;
- Avoid development or enlargement of storage, staging, and launch/landing areas for deployable technologies in or near residential areas, in order to reduce the potential that such activities could have adverse impacts on residential property values. Acceptable distances could vary, depending on the size of the facility, types of activities occurring there, the nature of the aesthetic impacts or other aspects that influence property values, and other factors such as residential density, local concern over aesthetics, desire for improved wireless communications, local media response, and more;
- Give preference to hiring workers who are local residents, where practicable; and
- Share deployment plans with public service providers, especially first responders, as early in the process as possible and throughout the deployment process. This will provide advance notice to public service providers, and would particularly allow first responders to be better prepared for emergencies that could arise during deployment.

17.9.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for socioeconomics beyond those listed above for all project types.

17.10. ENVIRONMENTAL JUSTICE

17.10.1. BMPs and Mitigation Measures for All Project Types

Impacts are considered environmental justice impacts only if they are both “adverse” and “disproportionately high” in their incidence on environmental justice populations relative to the general population (Council on Environmental Quality, 1997). Based on the analyses in Chapters 3 through 16, potential environmental justice impacts from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all BMPs identified throughout this PEIS that reduce adverse impacts of construction activities, such as generation of noise, dust, and traffic;

- Avoid setting deployment activities and facilities requiring construction in proximity to environmental justice communities, in order to reduce the potential that such activities would be seen as disproportionately affecting environmental justice communities. In general, proximity means within a distance at which noise and dust would be considered objectionable or where effects on traffic volume or patterns would be considered detrimental to local residents or businesses;
- Because of their potential impacts on property values, avoid development of new wireless communication towers in proximity to environmental justice communities in order to reduce the potential that such activities would be seen as disproportionately affecting environmental justice communities. Proximity could be defined variably depending on the nature of the aesthetic impacts, nature of other objectionable effects that influence property values, other factors (e.g., local concern over aesthetics), desire for improved wireless communications, local media response, etc. According to a recent literature review, measurable adverse impacts on property values are generally not observable beyond 300 meters (984 feet), and often are not observable beyond 100 meters (328 feet) (Bond, Sims, & Dent, 2013);
- Where possible, identify specific communities (i.e., neighborhoods or populations that may be contained within individual block groups) that are at risk of experiencing environmental justice impacts. Conduct targeted outreach to these communities—tailored to the specific racial, ethnic, financial, and/or cultural background—as early in the development process as possible to explain the nature and extent of specific potential impacts, and to gain feedback on those impacts;
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, buried, or undersea infrastructure, etc.); and
- Where possible, select infrastructure locations that are not within or near environmental justice communities, particularly new build options.

17.10.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for environmental justice beyond those listed above for all project types.

17.11. CULTURAL RESOURCES

17.11.1. BMPs and Mitigation Measures for All Project Types

Deployment involving ground disturbance has the potential to damage or destroy archaeological sites, and the attachment of communications equipment to historic building and structures has the potential to cause damage to features that are historically significant. Based on the analyses in Chapters 3 through 16, potential impacts from the proposed activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures to further reduce potential impacts:

- Follow all applicable federal requirements for consultation on the identification of and assessment of effects to cultural resources;

- Avoid deployment in areas with known historic properties and deploy equipment and facilities in alternate locations if practical;
- Ensure usage of an appropriate indirect effects Area of Potential Effects as part of pre-siting or pre-deployment surveys to sufficiently account for potential indirect effects to cultural resources;
- Establish procedures for pre-deployment monitoring if a project has the potential to adversely and indirectly affect historic properties to collect baseline data, monitor potential indirect effects during deployment, and determine if effects have occurred post-deployment;
- Develop BMPs and mitigation measures as part of a Memorandum of Agreement or Programmatic Agreement to address any potential effects, if they were to occur;
- Use low-impact construction alternatives, when feasible. For instance, ripping¹⁶ could be used as an alternative to blasting near structures or archaeological sites identified as at risk of effects from vibration. Other techniques such as bored piling could be used to minimize the vibration generated, where possible;
- Restrict the timing of deployment activities so as not to disturb the use of historic properties, as applicable. Stop work at certain times when traditional and/or religious properties are in use, such as during significant events (e.g., religious festivals or ceremonies);
- Design projects to mitigate potentially negative visual and auditory impacts of facilities. The following visual and noise abatement techniques should be considered: noise-reducing barriers, low-profile constructions, proper siting to maximize the use of topography and vegetation, screening, blending with topographic forms and existing vegetation patterns, and use of environmental coloration or advanced camouflage techniques to limit visual effects;
- Consult with site users through a community liaison team to understand site usage and how the project could affect user access; and
- Arrange alternative access using stakeholder input if access to an important cultural heritage site is restricted or blocked. Notify the public of the blockage and alternate means of access.

17.11.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for cultural resources beyond those listed above for all project types.

17.12. AIR QUALITY

17.12.1. BMPs and Mitigation Measures for All Project Types

The Proposed Action has the potential to generate air pollutant emissions through construction and deployment activities, including the use of large vehicles, heavy machinery, or generators. Based on the analyses in Chapters 3 through 16, the impact to air quality from the deployment and operation activities described above are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

¹⁶ Ripping is typically performed by a tractor or other heavy equipment to pull the rock.

- Follow all applicable federal, state, and local requirements for obtaining air pollution control permits for applicable emission sources;
- To the extent practicable, avoid constructing and operating sources in extreme or severe nonattainment areas;
- To the extent possible, avoid placement of air emission sources within Class I Areas;¹⁷
- Ensure all activities are in compliance with general conformity requirements in nonattainment and maintenance areas;
- For equipment with internal combustion engines, use engines certified to the lowest emission standards and engines that burn alternative fuels (e.g., natural gas, biofuels), and/or install emission control devices when practicable;
- Use low-sulfur or ultra-low-sulfur diesel fuel in construction equipment, trucks, vehicles, and generators;
- When possible, use vehicles with hybrid or electric technology to reduce or eliminate criteria pollutant emissions from fuel combustion;
- To control dust from construction or other land-disturbing activities, spray water on roads/construction areas, limit the area of uncovered soil to the minimum needed for each activity, site staging areas to minimize fugitive dust, use a soil stabilizer (chemical dust suppressor), mulch areas or use a temporary gravel cover, limit the number and speed of vehicles on the site, and cover trucks hauling dirt;
- Post and enforce speed limits on dirt/gravel roads to reduce airborne fugitive dust;
- Limit idling time of construction vehicle and equipment and conduct proper vehicle maintenance;
- Minimize the time of operation of UAS or aircraft below the mixing height (i.e., typically estimated at 3,000 feet aboveground level);
- Use electric or alternate fueled ground support equipment for UAS or other aircraft;
- Ensure all activities conform to the State Implementation Plan;
- Follow all applicable federal, state, and local air quality requirements, including standards for nuisance (where possible) and fossil fuel-powered generators;
- Ensure all diesel engines are compliant with USEPA emission standards for the corresponding engine class;
- Ensure all equipment are appropriately sized for the Proposed Action;
- Consider using hydrogen-fueled generators where practicable to reduce nitrous oxides emissions;
- Obtain permits, where required, to install and operate fossil fuel-powered generators;¹⁸
- Implement a dust control plan for construction activities and any travel over unpaved roads; and
- Ensure all fuel-burning equipment including, but not limited to, heavy construction equipment, power generators, and aerial platforms are maintained in accordance with manufacturer's specifications.

¹⁷ Class I areas are national parks and wilderness areas in attainment or unclassifiable areas that exceed 5,000 acres in size and were in existence on August 7, 1977.

¹⁸ Permits for stationary sources (diesel generators) should be obtained in advance of future deployment.

17.12.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for air quality beyond those listed above for all project types.

17.13. NOISE

17.13.1. BMPs and Mitigation Measures for All Project Types

The Proposed Action has the potential to generate noise during construction activities, deployment, and operation of various equipment. Based on the analyses in Chapters 3 through 16, the impacts to noise from the deployment and operation activities associated with the Proposed Action are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Follow all applicable federal, state, and local requirements for construction noise restrictions;
- For those projects involving heavy equipment for deployment that can generate noise, avoid, as practicable, deployment in areas with highly sensitive receptors and construct facilities in alternate locations. Such sensitive areas include foraging or breeding areas for disturbance-sensitive congregatory species (such as some species of bats, colonial waterbirds, and seabirds), particularly those species that are listed as threatened or endangered, as well as wilderness areas (where recreational activities such as hiking, bird watching, etc. occur);
- For construction and grading activities near populated areas, heavy equipment should use noise mufflers to limit noise exposure on noise-sensitive receptors;
- For construction and grading activities near other noise sensitive receptors, including parks or other protected areas, heavy equipment should use noise mufflers to limit noise exposure, and the use of such equipment should be limited to operation only during daytime hours;
- Follow all state and federal guidelines for limiting aircraft noise on populated areas and over national parks;
- Equipment that is expected to generate significant noise should include mitigation measures during the design and implementation phases of the project (e.g., use of noise barriers such as walls, shrubbery);
- Limit construction activities to daytime hours (7 a.m. to 7 p.m.) to the extent possible when increased noise levels are more tolerable and avoid construction on Sundays and legal holidays;
- Implement BMPs and mitigation measures as directed by the local jurisdiction such as avoiding unnecessary revving of engines, switching off equipment when not in use, changing location of stationary construction equipment, minimizing drop height of materials, replacing conventional audible reversing alarms with more quiet alternative reversing warning systems, setting equipment away from noise sensitive areas (if practicable), notifying adjacent residents in advance of construction work, installing temporary acoustic barriers around stationary construction noise sources, and other controls as needed to reduce increased noise levels; and

- Ensure, as practicable, all heavy equipment, power generators, and boats are maintained in accordance with manufacturer's specifications.

17.13.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wired Projects
 - New Build – Aerial Fiber Optic Plant
 - Do not permit underwater blasting and pile driving activities in any waterbody.
 - New Build – Submarine Fiber Optic Plant
 - Do not permit underwater blasting and pile driving activities in any waterbody.

17.14. CLIMATE CHANGE

17.14.1. BMPs and Mitigation Measures for All Project Types

The Proposed Action has the potential to generate GHG emissions during deployment and operation activities, which could include ground disturbing activities and the use of various equipment, machinery, and vehicles. Based on the analyses in Chapters 3 through 16, the climate change impacts from the deployment and operation activities described above are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Ensure proper sizing of both transmitting and generating equipment;
- Ensure that equipment used is the most energy efficient, or use state-of-the-art equipment to increase energy efficiency;
- Ensure that construction vehicles are running only when required for construction and reduce or limit unnecessary;
- Select energy-efficient technologies (both consuming and generating) whenever possible;
- Use renewable energy such as photovoltaic/battery/hybrid combinations where possible;
- Ensure proper loading of generating equipment during operations; and
- Rely on grid-delivered power whenever available and feasible.

Impacts on the project resulting from climate change, such as sea level rise or storm damage, would vary by state and deployment activity. BMPs and mitigation measures may have to be considered and tailored to specific sites and circumstances as each project is developed. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to address the impacts of climate change on the Proposed Action:

- Ensure design of aboveground structures and equipment has included allowances for maximum temperature and precipitation changes;
- Assess sea level rise prior to installation of infrastructure near coastal areas;
- Reinforce structures to include allowances for extreme weather events and flooding;

- Work jointly with public authorities in the implementation of monitoring plans and action plans related to potential impacts that could affect the Preferred Alternative;
- Ensure all operators and drivers have received adequate training to efficiently use equipment;
- Conduct regular maintenance and inspection on equipment to ensure that it is running at the maximum energy efficiency;
- Minimize disturbed land area and soil disturbance by collocating where it is feasible;
- Revegetate disturbed land areas after construction where it is feasible;
- Use more fuel-efficient diesel-power generation units or low-emission units such as gasoline- or hydrogen-fueled power generators; and
- Use access roads previously used during deployment activities for maintenance and operational activities.

17.14.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for climate change beyond those listed above for all project types.

17.15. HUMAN HEALTH AND SAFETY

17.15.1. BMPs and Mitigation Measures for All Project Types

Deployment involving construction activities has the potential for occupational injury to telecommunications workers. Based on the analyses in Chapters 3 through 16, the impacts to human health and safety from the deployment and operation activities are expected to be less than significant. FirstNet and/or its partners would require, as practicable or feasible, the following BMPs and mitigation measures, to further reduce potential impacts:

- Utilized trained and licensed heavy equipment operators, when available or required;
- Develop site-specific Health and Safety Plans that identify all potential physical and chemical hazards present at the site, including historic contamination;
- Develop and utilize Standard Operating Procedures for site preparation activities and include description of work practice controls and administrative control;
- Ensure workers wear proper safety equipment, such as high visibility safety vests, hard hats, steel toe boots, gloves, eye protection, and hearing protection;
- Provide daily safety meetings to review activities, potential hazards, and safety objectives;
- Avoid site preparation work in areas with high vehicle traffic volume, such as road ROWs;
- Avoid site preparation work in areas known to contain environmental contamination or mines;
- Follow all applicable federal, state, and local requirements for hazardous materials and hazardous waste management;
- Incorporate all BMPs and mitigation measures listed in Section 17.4, Water Resources, for potential impacts to water quality—sedimentation, pollutants, nutrients or water temperature, and changes to groundwater or aquifer characteristics;
- Incorporate all BMPs and mitigation measures listed in Section 17.12, Air Quality;

- Incorporate all BMPs and mitigation measures listed in Section 17.2, Soils, for potential impacts from soil erosion;
- Conduct air and noise monitoring to ensure levels stay within health-protective levels for communities and workers, and as required, that workers are trained and comply with personal protective equipment requirements as established by the Occupational Safety and Health Administration (OSHA);
- Search for the location of federal and state Superfund sites prior to site section in the area where the Proposed Action site is being considered, for new or existing infrastructure projects. If a Superfund site is located at or immediately adjacent to the Proposed Action activities, site-specific worker health and safety protection measures may be required;
- Ensure that appropriate measures are taken in compliance with applicable regulations (including the Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act of 1976) if construction occurs in an area where there is the potential for legacy soil contamination, to protect workers and the public from unacceptable levels of exposure to contaminants as a result of deployment activities;
- Establish an emergency response plan (including emergency preparedness and response activities, resources, and responsibilities) to attend to specific emergencies (e.g., accidental spills) that could arise during deployment;
- Ensure that reporting requirements are followed in the event that Emergency Planning and Community Right-to-Know Act reporting thresholds are reached for the shipping, handling or storage of gasoline or diesel used for equipment and generators²⁰;
- Establish a grievance mechanism or other stakeholder engagement tool that is accessible and culturally appropriate for use by the community to express concerns regarding the Preferred Alternative;
- Incorporate all BMPs and mitigation measures listed in Section 17.1, Infrastructure, on potential impacts to transportation system capacity and safety;
- As needed, implement community education and public awareness about the Preferred Alternative's traffic, routes used, road signage, and safety which are particularly critical in high-risk areas;
- Use signage to clearly mark construction sites and establish boundaries and barricades to keep people out of dangerous areas;
- Make sure an incident investigation procedure is in place that can be specifically used for any near misses or incidents involving workers and community members;

¹⁹ The main objective of the Resource Conservation and Recovery Act of 1976 is to "protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner" (USEPA, 2015a). The Comprehensive Environmental Response, Compensation, and Liability Act or Superfund law, was designed to help clean up hazardous waste sites and releases of pollutants or contaminants that may negatively affect public health (USEPA, 2015b).

²⁰ The Emergency Planning and Community Right-to-Know Act of 1986 was designed to assist communities in planning for emergencies related to hazardous waste. The law also requires industry to inform federal, state, and local governments on the storage, use, and releases of hazardous chemicals: 75,000 gallons for gasoline; 100,000 gallons for diesel, and 10,000 pounds for all other hazardous chemicals (USEPA, 2015c)

- Ensure all workers are appropriately trained in wildlife identification and hazard management to minimize the likelihood of wildlife attacks;
- Ensure all workers are appropriately trained in weather hazard management and equipped with all necessary personal protective equipment to avoid potential cold stress impacts such as hypothermia and frostbite or heat-related hazards such as heat stroke;
- Incorporate all BMPs and mitigation measures listed in Section 17.13, Noise;
- Inform community members of dates and times of construction activities that are likely to generate noise at levels above 55 A-weighted decibels at the residences or workplaces of those individuals;
- Monitor land clearing and construction sites for areas of standing water, including ditches and holes in the ground, as well open receptacles (e.g., empty barrels) and fill or eliminate these hazards to prevent mosquito breeding; and
- Ensure that the appropriate medications are available for treatment of any infections that may arise in the workforce.

17.15.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures for human health and safety beyond those listed above for all project types.

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