TECHNICAL MEMORANDUM
INCONCEIVABLES ACCESS PLAN

Prepared for: Mary Morissette, Resolution Copper

Prepared by: Isaac Hung, E.I.T., WestLand Resources, Inc.

cc: Aaron Graham, WestLand Resources, Inc.
Jessica Steslow, E.I.T., WestLand Resources, Inc.

Date: October 2, 2020

Project No.: 807.176

INTRODUCTION

WestLand Resources, Inc. (WestLand), has prepared this memorandum describing updates to the proposed Inconceivables preliminary road routing (Inconceivables Road) described in the "Inconceivables Preliminary Road Routing" memorandum dated October 10, 2019. The intent for the road alignment is to improve recreational access to a climbing area from Arizona State Highway 177. The climbing area is commonly called "The Inconceivables" and is located approximately five miles south of Superior, Pinal County, Arizona in portions of Township 2 South, Range 12 East, Sections 26, 27, 34, and 35.

The proposed road routing has been updated per the recommendations of the WestLand cultural resources report titled "A Cultural Resources Inventory of 2.6 miles for the Inconceivables Road Project on the Tonto National Forest, South of Superior, Pinal County, Arizona" which identified three sites within the project area that are recommended eligible for inclusion in the National Register of Historic Places. These sites are identified as AR-03-12-02-2317, AR-03-12-02-2318, and AR-03-12-02-2320. The cultural resources report recommended using an alternate alignment for the first site to avoid affecting the historic property and using the already disturbed, existing two-track road through the two other sites.

DESIGN CRITERIA

The Inconceivables Road was previously designed per U.S. Forest Service (USFS) road maintenance level 3 guidelines for low to moderate traffic volume by standard passenger vehicles. As part of the road routing updates, the Inconceivables Road is now being designed per USFS road maintenance level 2 guidelines for low traffic volume by high clearance vehicles. WestLand prepared a memorandum discussing the difference between road maintenance levels 2 and 3, provided in **Appendix A.** Excerpts from the *Guidelines for Road Maintenance Levels* are provided in **Appendices B** and **C** (previously Attachment A of Appendix A)**.**

The design will largely be double-lane road except where the alignment goes through the noted archeological sites. In these areas, the road will be single-lane and will have rail barriers or fencing to limit access into and disturbance of the archeological site. There will be parking pullouts and proper signage at each double- to single-lane road transition to facilitate two-way traffic use of the single-lane roads. The design speed will be 10-35 miles per hour (mph), which will vary along the alignment depending on road characteristics such as radii of curvature and stopping sight distances per American Association of State Highway and Transportation Officials (AASHTO) guidelines. The road slope is recommended to be less than 10% per the *Forest Road Construction and Maintenance* guidelines published by the USFS[1].

Additional design criteria including the width of the traveled way, shoulder width, and clearing width should be considered during the route refinement stage in the future. For this preliminary road routing design, the width of the travel lane is assumed to be 24 feet and the shoulder widths are 8 feet each, as the actual alignment may shift due to topography. For the final road design, the shoulder widths will be minimized, and the road width will be reduced. The actual road width shall be 22 feet total, including the shoulders. **Figure 1** shows the updated preliminary road routing developed by WestLand. The proposed routing is approximately 2.7 miles long and follows the existing primitive trail for the first 0.78 miles. The conceptual road routing has a maximum slope of 9.7% as it descends into the valley adjacent to "The Inconceivables" and an elevation gain of approximately 190 feet from the lowest point in the road to the highest point in the road, as shown in **Figure 2**. As the road route is refined, additional routing options may be considered to further decrease the maximum slope, reduce the aesthetic impact to the area, or address other factors.

ROUTE UPDATES FOR ARCHAEOLOGICAL SITE AR-02-2317

This site is located on the western end of the alignment. The cultural report recommended avoiding going through this site. Alternate routes to the north and south of the site were surveyed and cleared for cultural impacts. The Inconceivables Road was adjusted to follow the south alternative, since the north alternative was too close to a wash. The design for the Inconceivables Road in this segment will be a double-lane road with rail barriers or fencing on the side closest to the archaeological site.

ROUTE UPDATES FOR ARCHAEOLOGICAL SITE AR-02-2318

This is the largest of the three eligible sites, located on the central portion of the alignment. The cultural report recommended using the existing two-track road through the site. Continued use of the road is not expected to impact any existing features and/or artifacts provided its use is limited to the existing prism and no blading and/or road improvements occur within the site boundary. If these conditions are met, the project will have no adverse effect on this historic property. The design for the Inconceivables Road in this segment will be a single-lane road following the existing trail, with minimal changes to width

[1] U.S. Forest Service. n.d. *Forest Road Construction and Maintenance.* U.S. Department of Agriculture. https://www.nrs.fs.fed.us/fmg/nfmg/docs/mn/roads.pdf

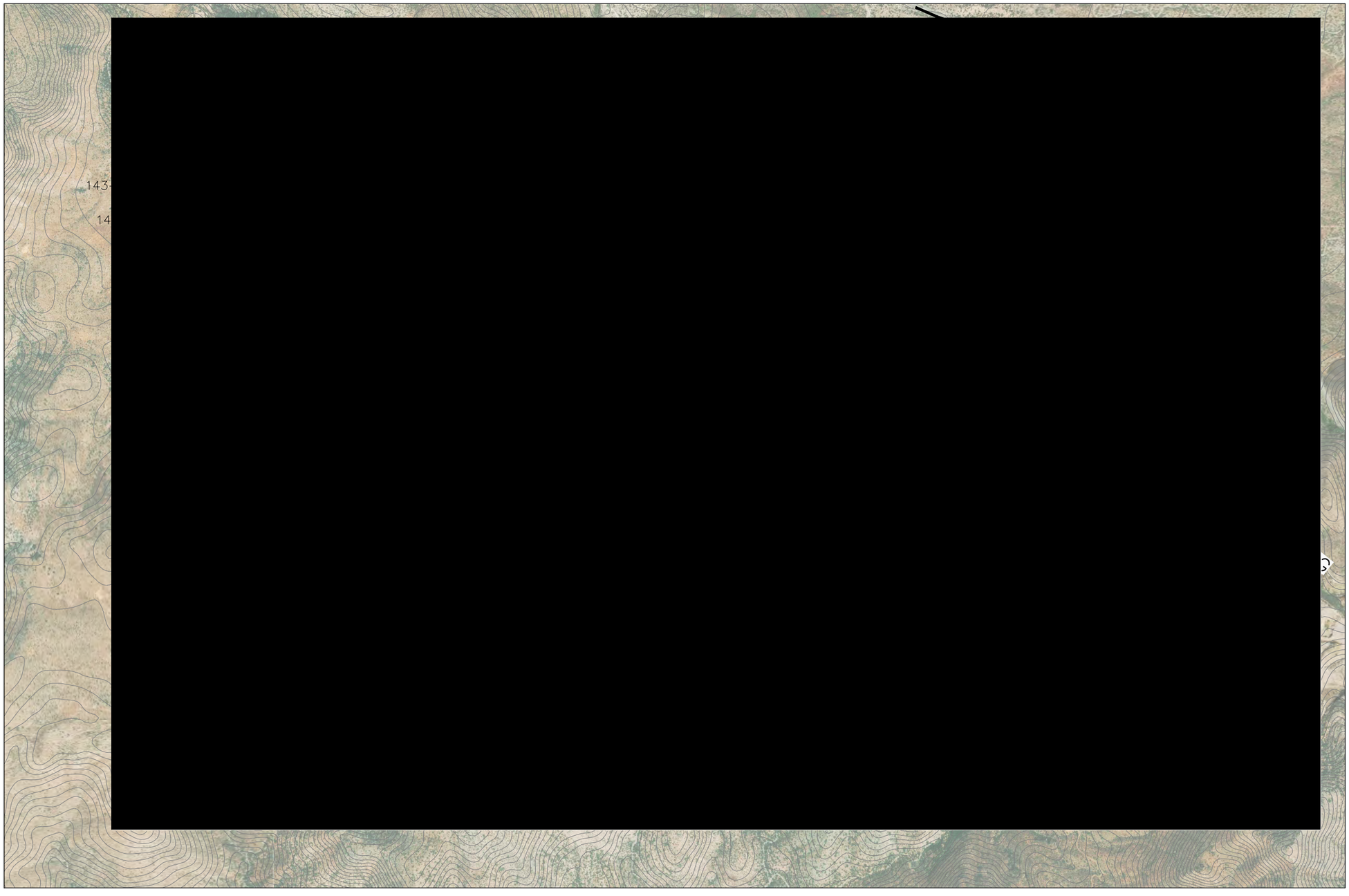
and grade. Both sides of the road will have rail barriers or fencing to limit access into the archaeological site. Parking pullouts will be located on both ends of this road segment and outside of the archaeological site boundaries.

ROUTE UPDATES FOR ARCHAEOLOGICAL SITE AR-02-2320

This is the smallest of the three eligible sites, located on the eastern portion of the alignment. The cultural report recommended using the existing two-track road through the site. Continued use of the road is not expected to impact any existing features and/or artifacts provided its use is limited to the existing prism and no blading and/or road improvements occur within the site boundary. If these conditions are met, the project will have no adverse effect on this historic property. The design for the Inconceivables Road in this segment will be a single-lane road following the existing trail, with minimal changes to width and grade. Both sides of the road will have rail barriers or fencing to limit access into the archaeological site. Parking pullouts will be located on both ends of this road segment and outside of the archaeological site boundaries.

Figure 1. Preliminary Road Routing
Figure 2. Proposed Road Profile
Appendix A. Inconceivables Road Forest Service Maintenance Levels Technical Memorandum
Appendix B. Excerpt from Guidelines for Road Maintenance Levels: Road Maintenance Level 3
Appendix C. Excerpt from Guidelines for Road Maintenance Levels: Road Maintenance Level 2

FIGURES



N

W E

S

0' 1000'

SCALE: 1" = 1000'

LEGEND

PROPOSED ROAD

PROPOSED PARKING PULLOUT

ARCHEOLOGICAL SITE

CLIMB LOCATION

NOTES:

1. CLIMB LOCATIONS PROVIDED BY MIKE "JAY BONE" COVINGTON AND QUEEN CREEK COALITION ON JANUARY 5, 2019 BY EMAIL.
2. THIS DRAWING IS SCHEMATIC IN NATURE AND NOT INTENDED FOR CONSTRUCTION.

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(520) 206-9585

RESOLUTION COPPER

INCONCEIVABLE PRELIMINARY ROAD ROUTING

PRELIMINARY ROAD ROUTING
FIGURE 1

APRIL 07, 2020

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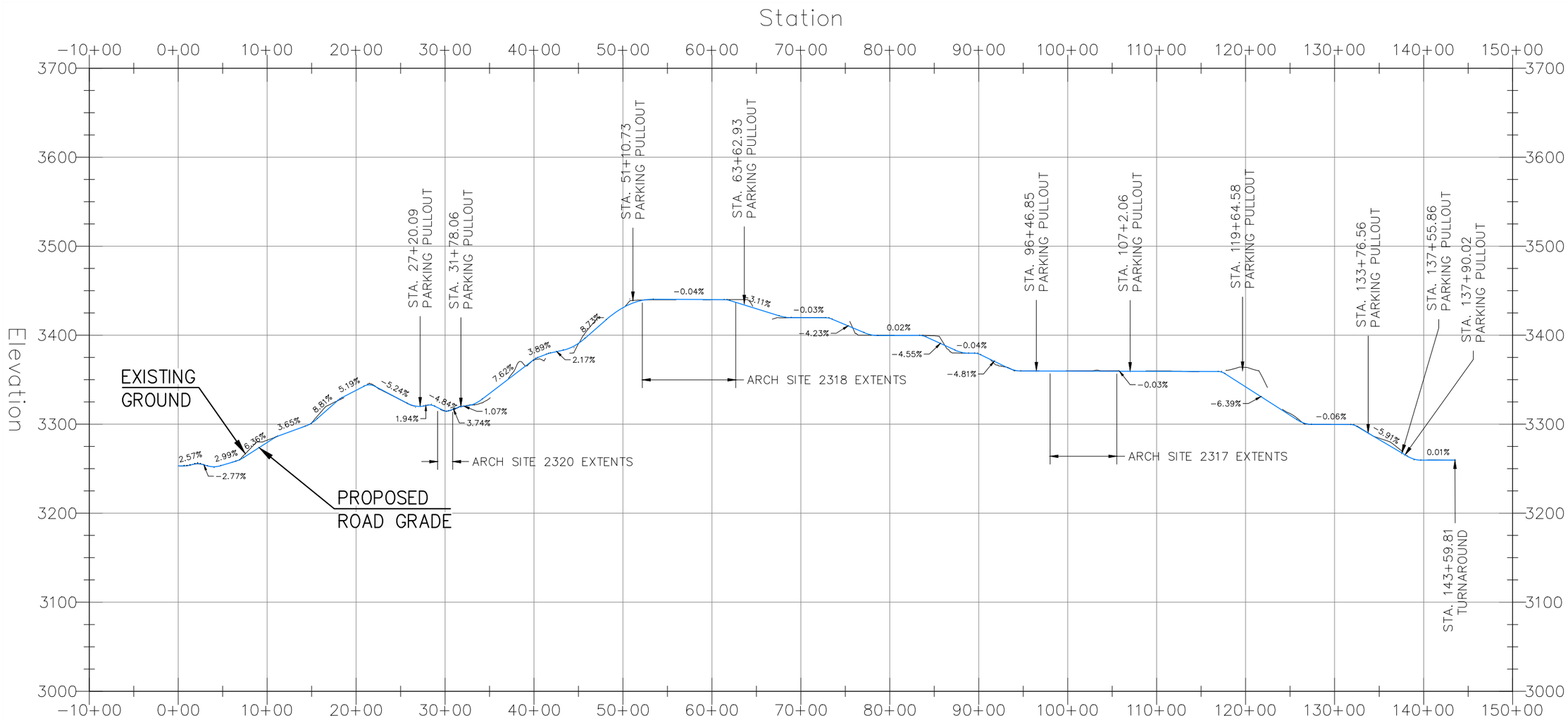

NOTE:
1. THIS DRAWING IS SCHEMATIC IN NATURE AND NOT INTENDED FOR CONSTRUCTION.

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INCONCEIVABLE PRELIMINARY ROAD ROUTING

PROPOSED ROAD PROFILE
FIGURE 2

APRIL 07, 2020

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APPENDIX A

Inconceivables Road
Forest Service
Maintenance Levels
Technical
Memorandum

TECHNICAL MEMORANDUM
INCONCEIVABLES ROAD FOREST SERVICE MAINTENANCE LEVELS

Prepared for: Mary Morissette, Resolution Copper

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cc: Aaron Graham, WestLand Resources, Inc.
Jessica Steslow, E.I.T., WestLand Resources, Inc.

Date: June 29, 2020

Project No.: 807.176

INTRODUCTION

WestLand Resources, Inc. (WestLand), has prepared this memorandum describing the differences between Forest Service Maintenance Level 2 and Level 3 to inform the design of the proposed Inconceivables Road project, in support of Resolution Copper Mine. The proposed road is intended to connect Arizona State Highway 177 (AZ-177) to a climbing area commonly called "The Inconceivables" which is located approximately five miles south of Superior, Pinal County, Arizona in portions of Township 2 South, Range 12 East, Sections 26, 27, 34, and 35.

Forest Service Road (FR) 319, also named Goatwater Spring, begins at AZ-177 approximately 2,000 feet south of mile post 162. FR 319 is a Forest Service Maintenance Level 2 road and allows high clearance vehicle traffic. Currently, an unmaintained, primitive trail branching off of Goatwater Spring is used for the primary access to "The Inconceivables" area. The trailhead for the primitive trail is approximately 2,070 feet from the start of FR 319 at AZ-177.

FOREST SERVICE ROAD MAINTENANCE LEVELS

The proposed road and surrounding areas, including "The Inconceivables" climbing area, is entirely on Tonto National Forest Land and is managed by the U.S. Forest Service (USFS). The USFS categorizes roads in their management area according to different Maintenance Levels based on the road use. The assigned Forest Service Maintenance Level indicates management strategies of the Forest Service and is a helpful guide for appropriate road design. The USFS states maintenance levels must be consistent with road management objectives and maintenance criteria (USFS 2005).

The maintenance level assigned to a road is not fixed and can be updated as a road changes in use, but it is supposed to reflect current road use conditions and current maintenance expectations. Considerations for the current operational maintenance level include current needs, road condition, budget constraints, and environmental concerns. An object maintenance level may be established for

future management objectives, travel needs, budget constraints, and environmental concerns. The objective maintenance level may be higher or lower than the operational maintenance level.

USFS road maintenance levels are defined between levels 5 through 1 with road maintenance level 5 being a high-volume road designed with a high degree of user comfort and maintenance requirements, and level 1 being a low-volume road with a low degree of user comfort and maintenance requirements. The Forest Service Handbook (FSH) 7709.56 Road Preconstruction Handbook Chapter 40 (USFS 2014) states:

> *National Forest System (NFS) roads with an objective road maintenance level of 3, 4, or 5 meet the definition of a public road and are subject to Federal safety requirements for public roads. These NFS roads are also subject to the requirements in FSM 7705, FSM 7731, FSM 7733, and FSH 7709.59. Users can expect to drive these roads in any typical design vehicle type, including standard passenger cars. They can expect some degree of consideration regarding comfort, convenience, and speed of travel.*
>
> *NFS roads, with an objective maintenance level of 1 or 2, meet the definition of an administrative NFS road. User comfort, convenience, and speed of travel are not management considerations for these roads, and no provision is made to warn users regarding hazards on the road. The design of administrative NFS roads should reflect that users of these roads assume risks associated with using roads where hazards like pot holes, washouts, and fallen trees may be present and do so knowing no warning is provided.*

The USFS road maintenance level is comparable to but distinct from the American Association of State Highway and Transportation Officials (AASHTO) level of service, which is rated A through F.

FOREST SERVICE ROAD MAINTENANCE LEVEL 3

As described in the USFS document *Guidelines for Road Maintenance Levels*, road maintenance level 3 is assigned to roads for drivers in standard passenger vehicles, with user comfort as a low priority. Roads in this maintenance level are typically low speed, single lane with turnouts, and spot surfacing (USFS 2005). These roads are subject to the requirements of the Highway Safety Act and the Manual on Uniform Traffic Control Devices (MUTCD). Typically, these roads have low to moderate traffic volumes, connect to arterial and collector roads, have dips and culverts to provide drainage, and may include some dispersed recreation roads.

The maintenance guidelines for road maintenance level 3 is to maintain the surface for prudent drivers in standard passenger vehicle cars. Some roughness is tolerated and replace the base course and surface as necessary. The drainage should be kept functional for road use and to prevent environmental damage. Route markers, warnings, regulatory, and guide signs; and other traffic devices for planned traffic should be installed and maintained as appropriate.

Roads with maintenance level 3 may be single or double lane, may or may not have shoulders, and typically have a gravel surface but may be of native surface.

FOREST SERVICE ROAD MAINTENANCE LEVEL 2

As described in the USFS document *Guidelines for Road Maintenance Levels*, road maintenance level 2 is assigned to roads for use by high-clearance vehicles (USFS 2005). Passenger car traffic is not a consideration. Traffic is normally low volume, usually consisting of one or a few of administrative, permitted, recreation, or specialized uses. Road maintenance level 2 is the lowest USFS maintenance level for a road that receives traffic. Roads become road maintenance level 1 when they are closed for a period greater than one year.

Roads in maintenance level 2 are typically low and low speed. Typically, these are local roads or connect to other local roads. Surface smoothness is not a consideration and dips are the preferred drainage treatment. These roads are not subject to the requirements of the Highway Safety Act.

The maintenance guidelines for road maintenance level 2 is to maintain the surface for drivers in high clearance vehicles. The road surface and shoulder should be maintained only as necessary to provide passage for high clearance vehicles. The drainage should be kept functional for road use and to prevent environmental damage. Route markers, warnings, regulatory and guide signs; and other traffic devices for planned traffic should be installed and maintained as appropriate.

Roads with maintenance level 2 are typically single lane, may or may not have shoulders, and typically have a native surface but may also be pit-run from use.

EXAMPLES OF ROAD MAINTENANCE LEVELS 3 AND 2

See **Attachment A** for an expert of *Guidelines for Road Maintenance Levels* for descriptions and photos of Forest Service roads of road maintenance level 3 and 2.

REFERENCES

U.S. Department of Agriculture, Forest Service (USFS). 2014. *FSH 7709.56 Road Preconstruction Handbook Chapter 40*. FSH 7709.56_40 (Amendment FSH 7709.56-2014-1). Washington, DC.

U.S. Department of Agriculture, Forest Service (USFS). 2005. *Guidelines for Road Maintenance Levels*. Technology & Development Program 7700-Transportation Management 0577 1205-SDTDC. December 2005.

APPENDIX B

Excerpt from Guidelines for Road Maintenance Levels: Road Maintenance Level 3

Road Maintenance Level 3
Road maintenance level 3 is defined in the FSH 7709.58,10,12.3 as:

> Assigned to roads open and maintained for travel by prudent drivers in a standard passenger cars. User comfort and convenience are low priorities.
>
> Roads in this maintenance level are typically low speed, single lane with turnouts, and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either “encourage” or “accept.” “Discourage” or “prohibit” strategies may be employed for certain classes of vehicles or users.

These roads have the following attributes:

- Subject to the requirements of Highway Safety Act and MUTCD.
- Roads have low- to moderate-traffic volume.
- Typically connect to arterial and collectors roads.
- A combination of dips and culverts provide drainage.
- May include some dispersed recreation roads.
- Potholing or washboarding may occur.

Maintenance prescription guidelines from the FSH 7709.58,10,12.6, exhibit 01 include:

General. As needed.

Traveled way. Maintain surface to provide travel by prudent drivers in standard passenger cars. Some surface roughness is tolerated. User comfort and convenience is a low priority. Maintain a traveled way crown or cross slope to provide adequate drainage. Replace the base course and surfacing as needed.

Shoulder. Maintain existing shoulders commensurate with the traveled way.

Drainage. As necessary to keep drainage facilities functional and prevent unacceptable environmental damage.

Roadway. Maintain existing vegetative cover. Control the vegetation to provide sight distance. Repair and/or remove slides and slumps to provide passage by prudent drivers in standard passenger cars.

Roadside. Remove hazard trees and clean up litter.

Structure. Maintain all structures to provide for passage of planned traffic and to preserve structures for future use. Defer noncritical items and combine to provide for more economical project. For example, defective bridge rails, running planks, and bridge guideposts on a current basis. Defer the painting of bridge rails to a logical project cycle.

Traffic service. Install and maintain route markers; warning, regulatory, and guide signs; and other traffic devices to provide for planned traffic.

Figure 12—Maintenance level 3 road with single lane, gravel surface, and gravel shoulders.

Figure 13—Maintenance level 3 road with single lane, gravel surface, and gravel shoulders.

Figure 14—Maintenance level 3 road with single lane, gravel surface, and gravel shoulders.

Figure 15—Maintenance level 3 road with single lane, gravel surface, and gravel shoulders.

Figure 16—Maintenance level 3 road with single lane, gravel surface, no shoulders, and a cross drain dip.

Figure 17—Maintenance level 3 road with single lane, gravel surface, and no shoulders.

Figure 18—Maintenance level 3 road with double lanes and native road surface with shoulders.

Figure 19—Maintenance level 3 road with single lane, gravel surface, and no shoulders.

Figure 20—Maintenance level 3 road with single lane, gravel surface, and no shoulders.

APPENDIX C

Excerpt from Guidelines for Road Maintenance Levels: Road Maintenance Level 2

Road Maintenance Level 2

Road maintenance level 2 is defined in the FSH 7709.58,10,12.3 as:

Assigned to roads open for use by high-clearance vehicles . Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either to (1) discourage or prohibit passenger cars or (2) accept or discourage high-clearance vehicles.

These roads have the following attributes:

- Roads have low traffic volume and low speed.
- Typically local roads.
- Typically connect collectors or other local roads.
- Dips are the preferred drainage treatment.
- Not subject to the requirements of the Highway Safety Act.
- Surface smoothness is not a consideration.
- Not suitable for passnger cars.

Maintenance prescription guidelines are from the FSH 7709.58,10,12.6, exhibit 01 and include:

General. As needed.

Traveled way. Log out and brush as necessary to provide passage for planned traffic. Maintain road prism to provide for passage of high-clearance vehicles.

Shoulder. Maintain only as necessary for planned traffic.

Drainage. As necessary to keep drainage facilities functional and prevent unacceptable environmental damage.

Roadway. Manage vegetative cover as needed for planned traffic. Remove and/or repair slides and/or slumps as needed for access with high clearance vehicles to control resource damage.

Roadside. Generally no work is required.

Structure. Maintain all structures to provide for the passage of planned traffic.

Traffic service. Install and maintain route markers; warning, regulatory, and guide signs; and other traffic control devices to provide for planned traffic and an appropriate traffic management strategy.

Figure 22—Maintenance level 2 road with single lane, pit-run surface, no shoulders.

Figure 23—Maintenance level 2 road with single lane and native surface.

Figure 24—Maintenance level 2 road with single lane, pit-run surface, no shoulders, and suitable for high-clearance vehicles, but with very limited sight distance due to extreme vegetative encroachment.

Figure 25—Maintenance level 2 road with single lane, native surface, no shoulders, and suitable for high-clearance vehicles only.

Figure 26—Maintenance level 2 road with single lane, native surface, no shoulders, and suitable for high-clearance vehicles only.

Figure 27—Maintenance level 2 road that has been “temporarily” closed.