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1. INTRODUCTION

This preliminary Rosemont Copper Transportation Plan provides guidelines to help minimize impacts to areas, resources, and people adjoining, served by, or otherwise affected by roads on United States Forest Service land which will be used by Rosemont and its agents as part of the mine site. To that end, the Transportation Plan will:

- Identify the levels of use by Rosemont of the various roadways in the area, both inside and outside the fence boundary;
- Identify the level of public access allowed on the primary and secondary mine access roads;
- Specify design, construction, and maintenance standards for roadways under the responsibility of Rosemont; and
- Describe travel demand management measures to be implemented by Rosemont in order to mitigate impacts on State Route 83.
2. EXISTING CONDITIONS

There are approximately 24 Forest Service access roads in the vicinity of the proposed Rosemont fence boundary for the Barrel Alternative. Table 1 lists those roadways, along with the types of vehicles which are permitted on the roadway and which agency currently maintains the roadway. Figure 1 shows a map of the existing Forest Service roads as well as the Rosemont fence boundary, for reference.

Table 1. Existing Forest Service Roads Within Project Area

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Level of Use</th>
<th>Maintained By</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS 62</td>
<td>Highway-Legal</td>
<td>Forest Service, Pima County (outside of National Forest boundary)</td>
</tr>
<tr>
<td>(Box Canyon Road)</td>
<td>Vehicles</td>
<td></td>
</tr>
<tr>
<td>FS 231</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 231A</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 231B</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 505</td>
<td>Highway-Legal</td>
<td>Forest Service, Pima County (outside of National Forest boundary)</td>
</tr>
<tr>
<td>(Santa Rita Road)</td>
<td>Vehicles</td>
<td></td>
</tr>
<tr>
<td>FS 565</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4032</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4048</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4049</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4050</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4051</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4053</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4053A</td>
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</tr>
<tr>
<td>FS 4055</td>
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<tr>
<td>FS 4056</td>
<td>All Vehicles</td>
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<tr>
<td>FS 4058</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4059</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4062</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4063</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4064</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4066</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4072</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 4834</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
<tr>
<td>FS 8001</td>
<td>All Vehicles</td>
<td>Forest Service</td>
</tr>
</tbody>
</table>
Figure 1. Existing Forest Service Roads
3. PROJECT RELATED ROADS

A number of roads will serve Rosemont traffic, both inside and outside the project fence boundary. Figure 2 shows the external roads to be used by Rosemont, including the primary and secondary access roads. The figure also shows proposed connections between the primary access road and FS 4062 as well as between FS 4053 and FS 4056. Internal plant site roads are shown in Figure 3. The internal and external roads to be used by Rosemont are discussed in further detail in the following sections.

3.1. PRIMARY ACCESS ROAD

The primary access road provides a connection from the mine site to State Route 83 (SR 83). Much of the roadway alignment is on Forest Service land, but a short section of the roadway will be located within the Hidden Valley Ranch area, which is owned by Rosemont Copper.

3.1.1. Level of Rosemont Use

The primary access road will be used by all mine employees traveling to/from the site. In addition, the road will be used for deliveries and shipments of mine products.

3.1.2. Level of Public Use

During construction of the mine, access to the primary access road by the public would be infeasible and unsafe. Rosemont has no road design or traffic management methods that could be used to provide access during this period, and therefore, no public access will be allowed on the roadway during mine construction. All traffic into and out of the site during this period will be scheduled to minimize impact on schedule and surrounding traffic, and thus, any unscheduled traffic will cause consequences to schedule and outside traffic.

Once the construction of the mine is complete, public use for highway-legal vehicles will be allowed on the primary access road outside the perimeter fence, including the segment of road within the Hidden Valley Ranch owned by Rosemont. The instrument of said access is to be determined. However, if the primary access road becomes an area used to obstruct, slow, infringe, or otherwise hinder operational traffic by mine opponents, environmental groups, or others, Rosemont would like to be able to revisit the “non-exclusive” portion of the agreement.
Figure 2. External Roads
3.1.3. Design Standards

The primary access road will be designed using the following standards:

- AASHTO – Roadside Design Guide
- FHWA – Manual on Uniform Traffic Control Devices

The proposed cross-section of the primary access road will include two 14-foot travel lanes, and a four-foot shoulder on either side of the roadway. The primary access road will be paved.

![Figure 4. Primary Access Road Cross Section](image)

3.1.4. Maintenance Standards

The primary access road will be maintained by Rosemont to meet Forest Service maintenance standard FSM 7700 – Transportation System. In order to ensure public and employee safety, Rosemont will use on-site equipment to address road surface and drainage maintenance and repairs. Specifically:

- Road Surface: The primary access road will be paved, which will control dust and improve durability. The roadway surface will be inspected every six months and after every major storm event. Inspectors will check the road for potholes, rutting, or debris on the road surface. Repairs will be made as needed by Rosemont.
- Road Drainage: Culverts along the primary access road will be inspected after every major storm event. If deficiencies are identified, culverts, channels, and other drainage structures will be cleaned and repaired as needed.
3.1.5. Wildlife Crossing Structures

There are a number of potential crossing structures located along the primary access road, which can serve wildlife of varying sizes. Those structures include:

- Multi-cell arch culvert: The arch culvert has three cells, and is 42 feet wide and 8.5 feet tall, and will be located at the Barrel Canyon Wash, approximately ¼ mile west of SR 83. The culvert will allow large animals to cross the primary access road.
- Box culvert and 60-inch pipes: One reinforced concrete box culvert (8’ wide by 5’ tall) and four 60” pipes will provide crossing locations for medium animals along the primary access road.
- 30-inch pipes: Eight 30-inch pipes will allow small animals to cross the primary access road.

3.2. SECONDARY ACCESS ROAD

The secondary access road connects to the existing Santa Rita Road west of the project site. The eastern 1.5 to 2 miles of the secondary access road follows the alignment of existing Forest Service (FS) roads 505 and 4834. Most of the secondary access road is located on private land, owned by Rosemont Copper.

3.2.1. Level of Rosemont Use

Rosemont will use the secondary access road to access utilities in order to perform maintenance. The roadway will also provide emergency access to/from the site.

3.2.2. Level of Public Use

Rosemont does not plan to allow public use of the secondary access road along the private lands, and is restricted from doing so where the roadway is located on State land.

3.2.3. Design Standards

The primary access road will be designed using the following standards:

- FSM 7700 – Transportation System
- FSH 7709.56 – Road Preconstruction Handbook\textsuperscript{5}
- Mine Safety and Health Administration (MSHA)
The secondary access road will consist of a single lane, and will be unpaved. The roadway will be 12 feet wide, and will include two-foot berms in certain areas where required by MSHA.

3.2.4. Maintenance Standards
The secondary access road will be maintained by Rosemont to meet Forest Service maintenance standard FSM 7700. In order to ensure employee safety, Rosemont will use on-site equipment to address road surface and drainage maintenance and repairs. Specifically:

- Road Surface: The secondary access road will be inspected every six months and after every major storm event. Inspectors will check the road for potholes, rutting, or debris on the road surface. Surface lost to drainage will be replaced as needed by Rosemont.
- Road Drainage: Culverts along the primary access road will be inspected after every major storm event. If deficiencies are identified, culverts, channels, and other drainage structures will be cleaned and repaired as needed.

3.3. HIDDEN SPRINGS ROAD (FS 4062)

The existing connection of Hidden Springs Road (FS 4062) with SR 83 may be closed by the Arizona Department of Transportation (ADOT). However, Rosemont will provide an opportunity for a connection between the primary access road and FS 4062 (west of Barrel Canyon) in order to access the core shed, geology buildings, and solar demonstration areas. The possible connection would also provide public access to other Forest Service roads to the west, including the FS 8001 and the western section of FS 4062.

3.3.1. Level of Rosemont Use
Rosemont will use this roadway to access the core shed, geology buildings, and solar demonstration areas. The road may also be used for mine tours.

3.3.2. Level of Public Use
Public use for highway-legal vehicles will be allowed outside Rosemont Copper private property (Hidden Valley Ranch).
3.3.3. Design Standards
The spur off the primary access road will be designed using the following standards:

- FSM 7700 – Transportation System
- FSH 7709.56 – Road Preconstruction Handbook
- Mine Safety and Health Administration (MSHA)
- AASHTO – Guidelines for Geometric Design of Very Low-Volume Local Roads

3.3.4. Maintenance Standards
Hidden Springs Road will be maintained by Rosemont, between the closed entrance on SR 83 and the Rosemont buildings and from the primary access road to its connection with FS 4062, to meet Forest Service maintenance standard FSM 7700. Rosemont will not maintain the four-wheel drive portion of FS 4062. In order to ensure public and employee safety, Rosemont will use on-site equipment to address road surface and drainage maintenance and repairs. Specifically:

- Road Surface: The road surface will be inspected every six months and after every major storm event. Inspectors will check the road for potholes, rutting, or debris on the road surface.
- Road Drainage: Culverts along the primary access road will be inspected after every major storm event. If deficiencies are identified, culverts, channels, and other drainage structures will be cleaned and repaired as needed.

3.4. INTERNAL ROADS

There will be a number of internal roads, including plant site roads (primary and secondary), a perimeter road, maintenance roads, and ore haul roads. Rosemont will also use existing accessible Forest Service roads inside the fence boundary as needed for maintenance and operations. Examples include FS 231 and FS 4064.

3.4.1. Level of Rosemont Use
All of the internal roads will be for exclusive use by Rosemont. The haul roads will accommodate mining equipment, while the other roads will be designed for vehicular traffic.
3.4.2. Level of Public Use
No public use of the internal roads will be allowed. If desired by the Forest Service, a possible connection between FS 4056 and FS 4053 may be provided along the outside of the perimeter fence to accommodate the hang gliders that currently operate in the area. The connection would provide four-wheel drive access, and would be designed to Forest Service standards.

3.4.3. Design Standards
The internal roads will be designed using MSHA standards. Minimum widths of roadways and shoulders will be as shown in Table 2.

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Two-Lane Width</th>
<th>Shoulder Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ore haul roads, in pit</td>
<td>125' inclusive of berms</td>
<td>--</td>
</tr>
<tr>
<td>Ore haul roads, out of pit</td>
<td>150' inclusive of berms</td>
<td>--</td>
</tr>
<tr>
<td>Primary access road</td>
<td>28'</td>
<td>4' each side</td>
</tr>
<tr>
<td>Main plant roads</td>
<td>24'</td>
<td>4' each side</td>
</tr>
<tr>
<td>Secondary plant roads</td>
<td>12'(one lane)</td>
<td>4' each side</td>
</tr>
<tr>
<td>Maintenance roads, pond</td>
<td>12'(one lane)</td>
<td>4' each side</td>
</tr>
<tr>
<td>inspection roads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.4.4. Maintenance Standards
Roads for Rosemont within the project boundary will need to MSHA standards, which state that berms are required along the roadway equal to the mid-axle height of the largest piece of equipment using the road. Maintenance required for these roads will be periodic blading and watering to ensure a compacted and relatively even surface.
4. TRAVEL DEMAND MANAGEMENT MEASURES

4.1. WORK SHIFTS

The tentative work shift schedule included in the *Rosemont Project Mine Plan of Operations (MPO)*\(^7\) lists start and end times for different types of personnel to be employed by the mine. Start and end times for different employees will be staggered in order to reduce the impact to SR 83 and other surrounding roadways. According to information in the *MPO*, maintenance employees will work 7:00 am to 4:00 pm, and operations personnel will work 12-hour shifts from 6:00 am to 6:00 pm and 6:00 pm to 6:00 am, with some potential overlap. Shift workers will rotate between day and evening shifts, with approximately half of the 371 operations and maintenance workers being scheduled off on any given day. Salaried, technical, and administrative personnel are scheduled to work 8:00 am to 5:00 pm, but may be on site after 5:00 PM as needed.

The tentative work shift schedule is shown in Figure 5.

![Figure 5. Tentative Work Shift Schedule](image-url)
Employee schedules will be evaluated as personnel are hired and schedules are set. Operations and maintenance considerations will dictate final schedules. However, even as adjustments are made to the specific shift times for employees, Rosemont plans to maintain the staggered start and end times in order to minimize congestion.

4.2. CARPOOLING

Van pooling and carpooling were evaluated in the MPO with an average of five people per car. When potential impacts to SR 83 were evaluated for ADOT, the analysis was completed assuming no carpooling. However, Rosemont remains committed to evaluating car and/or van pooling, and will provide appropriate support for such programs. Specific arrangements will be developed as personnel are hired, and the plan will be evaluated and updated as employee origins are realized.

4.3. TIME RESTRICTIONS ON TRUCK TRAFFIC

Rosemont will restrict truck check-in and deliveries to off-peak hours in order to minimize congestion.

4.4. OTHER CONSIDERATIONS

Rosemont is coordinating specific mitigation measures with ADOT along SR 83. Mitigation measures will be in addition to the proposed T-Intersection on SR 83 accessing the primary access road.
5. REFERENCES


