To determine which route the Mars rover should pick to return to the charging station as quickly as possible, we need to calculate the expected travel time for each route and choose the one with the shortest expected travel time.
The expected travel time for each route is calculated by taking into account the probability of each type of terrain and the corresponding speed over that terrain. We will use the following formula to calculate the expected travel time for each route:

Expected Travel Time (hours) = (Distance / Speed over Sandy Terrain) * Probability of Sandy Terrain + (Distance / Speed over Smooth Terrain) * Probability of Smooth Terrain + (Distance / Speed over Rocky Terrain) * Probability of Rocky Terrain

For Route 1:

Distance = 2 km
Probability of Sandy Terrain = 20% (0.20)
Probability of Smooth Terrain = 30% (0.30)
Probability of Rocky Terrain = 50% (0.50)
Expected Travel Time (Route 1) = (2 km / 3 km/h) * 0.20 + (2 km / 5 km/h) * 0.30 + (2 km / 2 km/h) * 0.50
Expected Travel Time (Route 1) = (0.67 * 0.20 + 0.40 * 0.30 + 1.00 * 0.50) hours
Expected Travel Time (Route 1) = 0.754 hours

For Route 2:

Distance = 1.8 km
Probability of Sandy Terrain = 40% (0.40)
Probability of Smooth Terrain = 20% (0.20)
Probability of Rocky Terrain = 40% (0.40)
Expected Travel Time (Route 2) = (1.8 km / 3 km/h) * 0.40 + (1.8 km / 5 km/h) * 0.20 + (1.8 km / 2 km/h) * 0.40
Expected Travel Time (Route 2) = (0.60 * 0.40 + 0.36 * 0.20 + 0.90 * 0.40) hours
Expected Travel Time (Route 2) = 0.672 hours

For Route 3:

Distance = 3.1 km
Probability of Sandy Terrain = 50% (0.50)
Probability of Smooth Terrain = 40% (0.40)
Probability of Rocky Terrain = 10% (0.10)
Expected Travel Time (Route 3) = (3.1 km / 3 km/h) * 0.50 + (3.1 km / 5 km/h) * 0.40 + (3.1 km / 2 km/h) * 0.10
Expected Travel Time (Route 3) = (1.03 * 0.50 + 0.62 * 0.40 + 1.55 * 0.10) hours
Expected Travel Time (Route 3) = 0.918 hours

With the corrected calculations, we have the expected travel times for each route:

Route 1: 0.754 hours
Route 2: 0.672 hours
Route 3: 0.918 hours
The shortest expected travel time is for Route 2, which takes approximately 0.672 hours. Therefore, the Mars rover should pick Route 2 to return to the charging station as quickly as possible.

To determine which route the Mars rover should pick considering the additional information about obstacles (crater and bridge), we need to calculate the expected travel time for each route, taking into account the probability of encountering the obstacles.

For Route 1:
Expected Travel Time for Route 1 considering the additional information(hours)
= Expected Travel Time for Route 1 * probability for crater not damage + Expected Travel Time for Route 1 * probability for crater damage * (1 + 45/60)
$= 0.754 * 0.7 + 0.754 * 0.3 * (1 + 0.75) = 0.754 * (0.7 + 0.3 * 1.75) = 0.754 * 1.225$
$= 0.92365$ hours

For Route 2:
Expected Travel Time for Route 2 considering the additional information(hours)
= Expected Travel Time for Route 2 * probability for bridge not damage + Expected Travel Time for Route 2 * probability for bridge damage * (1 + 60/60)
$= 0.672 * 0.4 + 0.672 * 0.6 * (1 + 1) = 0.672 * (0.4 + 0.6 * 2) = 0.672 * 1.6$
$= 1.0752$ hours

For Route 3:

Expected Travel Time for Route 3 considering the additional information(hours)
= Expected Travel Time for Route 3
$= 0.918$ hours

So we should choose Route 3, because 0.918 hours < 0.92365 hours < 1.0752 hours.
That is:
Expected Travel Time for Route 3 considering the additional information(hours)
< Expected Travel Time for Route 1 considering the additional information(hours)
< Expected Travel Time for Route 2 considering the additional information(hours)

The ability to use a satellite to find out whether the terrain in route 3 is smooth can be very helpful in making an informed decision. This information can provide valuable insights into whether it's worth taking Route 3 or if another route should be chosen.

Now we ignore considering the additional information about obstacles (crater and bridge)

We have expected travel times for each route:

Route 1: 0.754 hours
Route 2: 0.672 hours
Route 3: 0.918 hours

If we can use a satellite to find out whether the terrain in route 3 is smooth, let the longest time we are willing to wait be T (hours).

So if we choose Route 3, we must ensure that expected travel times for Route 3 is the shortest.

So we must ensure that if we wait for T hours and if we find Route 3 is smooth, then if we pick route 3 the total cost time (wait time + travel time) is shorter than expected travel times for Route1 and Route2.

So we have:

$T + 3.1 / 5 <= \min(0.754, 0.672)$

$T + 0.62 <= 0.672$

$T <= 0.052$ (hours)

So we are willing to wait for at most 0.052 hours to ensure whether Route3 is smooth.

Then I put this problem into ChatGPT. And I find that
ChatGPT can help analyze the problem and provide a framework for decision-making, but there are certain aspects of the problem that may require detailed calculations and decision analysis that go beyond the scope of a text-based conversation.

ChatGPT may not be able to perform detailed calculations, especially when the problem involves specific numeric values, complex probabilistic scenarios, and cost-benefit analysis. In the example provided earlier, I had to manually calculate the expected travel times based on the given probabilities and speeds, which ChatGPT cannot calculate correctly in a text conversation.