**3.3 Probability and impact matrix**

Beyond the definitions of probability and impact, a further quantitative analysis of risk is required. Every risk is assigned a rate based on the probability and impact scores. This evaluation of risks is the way in which they are classified by their importance: the higher the risk rating, the higher their priority for attention. To manage ratings in a more organized manner, the probability and impact matrix is defined. This matrix specifies combinations of probability and impact that lead to rating the risks as very low, low, moderate, high or extreme. The following table shows the risk rating legend used for the elaboration of this project risk matrix:

|  |  |  |
| --- | --- | --- |
| **Risk Rating** | **Score** | **Colour** |
| *Extreme Risk* | [4 - 5] |  |
| *High Risk* | [3 - 4) |  |
| *Moderate Risk* | [2 - 3) |  |
| *Low Risk* | [1 - 2) |  |
| *Very Low Risk* | [0 - 1) |  |

Using the previous nomenclature, the matrix is defined next:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Probability** | | | | |
|  |  | **Very Low/.2** | **Low/.4** | **Medium/.6** | **High/.8** | **Very High/1** |
| **Impact** | **Very High/5** | 1 | 2 | 3 | 4 | 5 |
| **High/4** | 0.8 | 1.6 | 2.4 | 3.2 | 4 |
| **Medium/3** | 0.6 | 1.2 | 1.8 | 2.4 | 3 |
| **Low/2** | 0.4 | 0.8 | 1.2 | 1.6 | 2 |
| **Very Low/1** | 0.2 | 0.4 | 0.6 | 0.8 | 1 |

Depending on the risk score, the response and priority assigned to a risk will change. For example, risks that are in the red area of the matrix (high probability and high impact) may require priority action and aggressive response strategies while risks in the light green area may not require proactive management action beyond being considered as a warning.

Throughout the project risks may vary so, using this matrix, risks will be reconsidered, changing their rating if necessary.

**3.4 Risk Rating**

As already mentioned, risk rate is determined through probability and impact scores. In fact, it is the result of multiplying both scores. Hence, to identify a risk’s position in the matrix, first it is necessary to assess probability and impact score as explained in sections 3.1 and 3.2.

The previously defined matrix, represents impact as an overall score but in our case, different impact scores have been defined depending on the project objective that is threatened (scope, schedule, cost). Hence, to determine the general impact grade the following equation is defined:

where:

* “i" represents the different types of impact (scope, schedule, cost)
* Wi represents the importance or weight (from 0 to 1) of each of the impact types and it is satisfied that
* Ii represents the impact score of each of the types (from 0 to 5)

Consequently, the overall impact will have a value of (0-5] calculated doing a balance between each type of impact importance.

Regarding the weights defined for this project, it has been defined to equally distribute them between scope, schedule and cost because they all are at the same level of priority:

Once the general impact is calculated, the risk rating is defined as: