

# TECH TIP

## MANAGING RISKS IN P6 EPPM ORACLE PRIMAVERA P6 EPPM

When things turn bad on a project, there are always those that say, “We should have seen that coming.” In many cases, that is true. As a project manager, I would hold Risk Assessment sessions in which I asked the team to envision the demise of the project. In the exercise, we picture ourselves at the end of the project, sitting in a room discussing what went wrong. It’s a simple question: Why did the project fail?

*“Inspections. We always seem to be waiting for inspectors to show up and it keeps us from moving forward, sometimes by a week.”*

*“Permits. This city is a stickler for permits and they always take longer than expected. It can put the project on hold for a month.”*

*“Subcontractor delivery. If the subcontractor doesn’t complete clearing the site on schedule, we may miss our window of opportunity before the rainy season.”*

Often these types of risk are dutifully written down and pulled out later as excuses when they actually happen and the project fails. Real Risk Management turns these potentially devastating items into actionable plans to address them before they take down the project.

This Tech Tip outlines the Project Management Institute Project Management Body of Knowledge (PMI PMBOK®) approach to Risk Management and show how Oracle’s Primavera P6 Enterprise Project and Portfolio Management (EPPM) application puts it into practice.

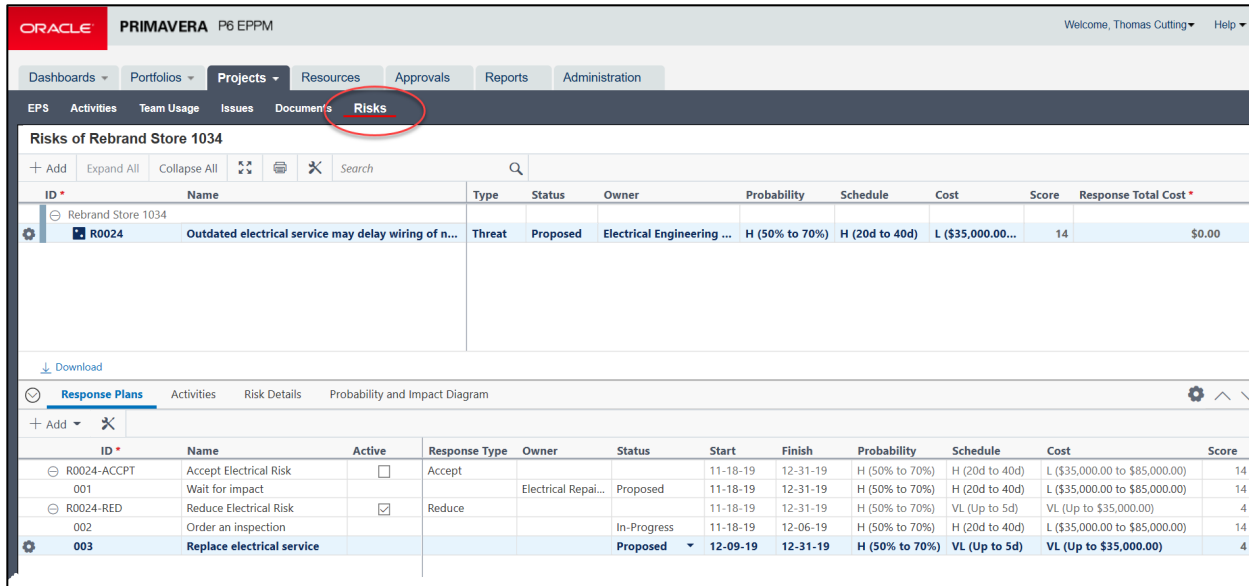
### **Plan Risk Management**

To manage risk effectively, you first have to agree on how risks should be managed. This step documents how risks will be identified, analyzed, and handled throughout the project. Although not captured in P6 EPPM, the Risk Management Plan is important for communicating how the application will be used as part of the process.

### **Identify Risks**

The Identify Risks step is simply the act of getting items that could potentially impact the project out in the open for discussion. Whether you use the worst case scenario exercise or some other method for identifying risks, logging and defining the risks can be done in P6 EPPM in the Projects tab, Risks window.

# MANAGING RISKS IN P6 EPPM



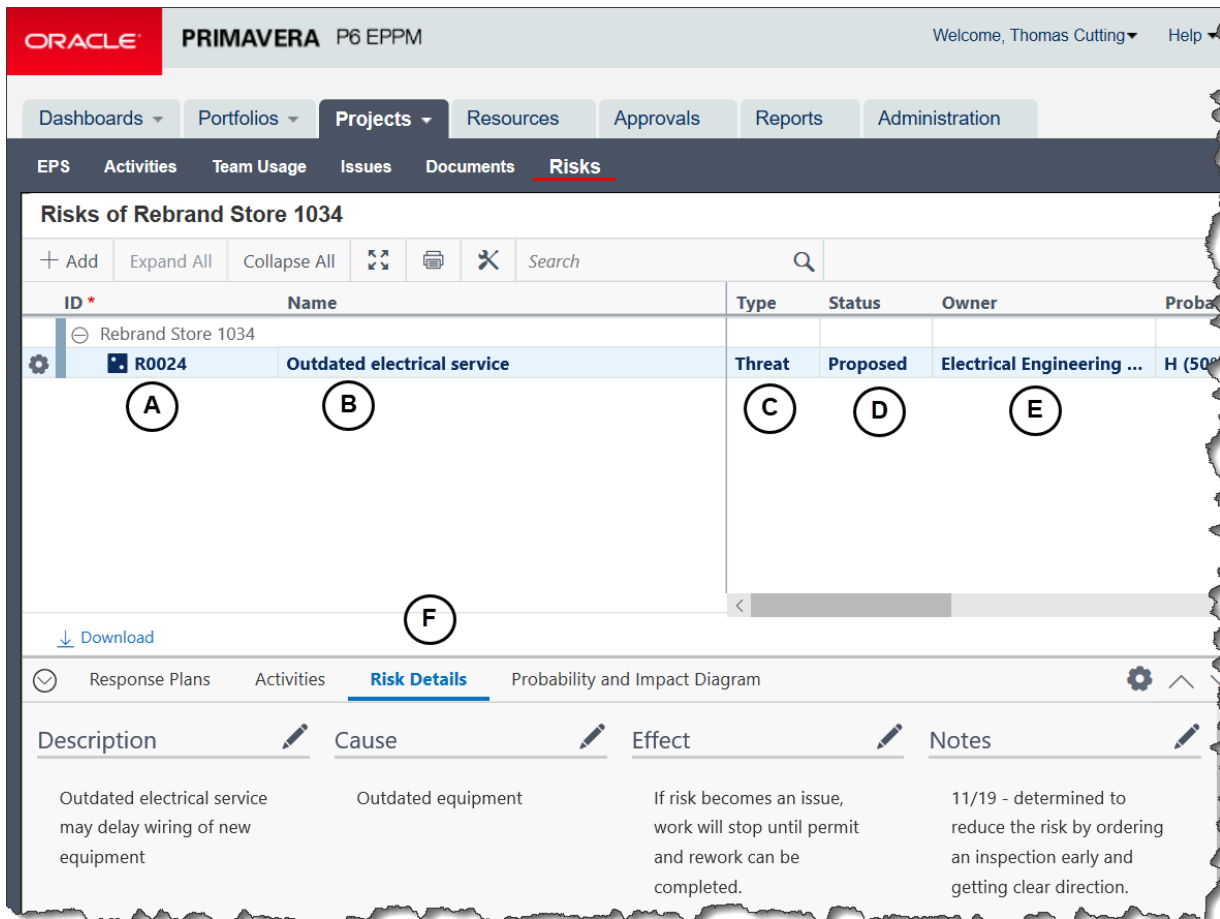
Oracle Primavera P6 EPPM interface showing the 'Risks' tab. The 'Risks of Rebrand Store 1034' table is displayed, listing risks such as 'Outdated electrical service may delay wiring of n...'. The 'Add' button is circled in red.

ID *	Name	Type	Status	Owner	Probability	Schedule	Cost	Score	Response Total Cost *
R0024	Outdated electrical service may delay wiring of n...	Threat	Proposed	Electrical Engineering ...	H (50% to 70%)	H (20d to 40d)	L (\$35,000.00...	14	\$0.00

Below the risks table, the 'Response Plans' section is visible, showing a table of response plans for the selected risk.

ID *	Name	Active	Response Type	Owner	Status	Start	Finish	Probability	Schedule	Cost	Score
R0024-ACCPT	Accept Electrical Risk	<input type="checkbox"/>	Accept	Electrical Repai...	Proposed	11-18-19	12-31-19	H (50% to 70%)	H (20d to 40d)	L (\$35,000.00 to \$85,000.00)	14
001	Wait for impact	<input type="checkbox"/>				11-18-19	12-31-19	H (50% to 70%)	H (20d to 40d)	L (\$35,000.00 to \$85,000.00)	14
R0024-RED	Reduce Electrical Risk	<input checked="" type="checkbox"/>	Reduce			11-18-19	12-31-19	H (50% to 70%)	VL (Up to 5d)	VL (Up to \$35,000.00)	4
002	Order an inspection	<input type="checkbox"/>			In-Progress	11-18-19	12-06-19	H (50% to 70%)	H (20d to 40d)	L (\$35,000.00 to \$85,000.00)	14
003	Replace electrical service	<input type="checkbox"/>			Proposed	12-09-19	12-31-19	H (50% to 70%)	VL (Up to 5d)	VL (Up to \$35,000.00)	4

Identified risks can be entered into the risk registry by clicking the Add button to open a new line.



Oracle Primavera P6 EPPM interface showing the 'Risk Details' view for risk R0024. The risk is 'Outdated electrical service'. The 'Add' button is circled in red. The risk details are shown in a table with columns: Description, Cause, Effect, and Notes.

ID *	Name	Type	Status	Owner	Probab
R0024	Outdated electrical service	Threat	Proposed	Electrical Engineering ...	H (50%

Below the risks table, the 'Risk Details' section is visible, showing a table of risk details for the selected risk.

Description	Cause	Effect	Notes
Outdated electrical service may delay wiring of new equipment	Outdated equipment	If risk becomes an issue, work will stop until permit and rework can be completed.	11/19 - determined to reduce the risk by ordering an inspection early and getting clear direction.

# MANAGING RISKS IN P6 EPPM

For the Identify step, the following fields should be filled:

- A. **ID** P6 EPMM will automatically create an id, but if you have a standard numbering method, you can replace it as long as it is unique.
- B. **Name** Replace the generic name with a meaningful one.
- C. **Type** The options are Threat or Opportunity. A Threat is something that will negatively impact your cost or schedule. An Opportunity is a risk that may benefit your project. An example of an Opportunity would be a monetary incentive for completing the project ahead of schedule. For this type of risk, you are creating a plan to make the risk come true instead of stopping it from impacting your project.
- D. **Status** Options include Proposed, Active, Open, Rejected (Closed), Managed (Closed), and Impacted (Closed). When to classify your risk as one of these options is something that should be decided and documented in your Risk Management Plan.
- E. **Owner** Any Resource can be selected as the Risk Owner.
- F. **Risk Details** In the Details window at the bottom of the risk is a tab that holds the Description, Cause, Effect, and Notes. Use these to define the risk in a way that explains the true impact to the project. For example, saying, "The electrical service is old" is not helpful. The team needs to understand the impact of that on the cost and schedule. A better Description would be "An inspection may determine that the outdated electrical service isn't sufficient to power the new equipment, causing a 2-week delay for permitting and replacing it." The Cause and Effect can be used to clarify further. Notes can capture additional information throughout the project.

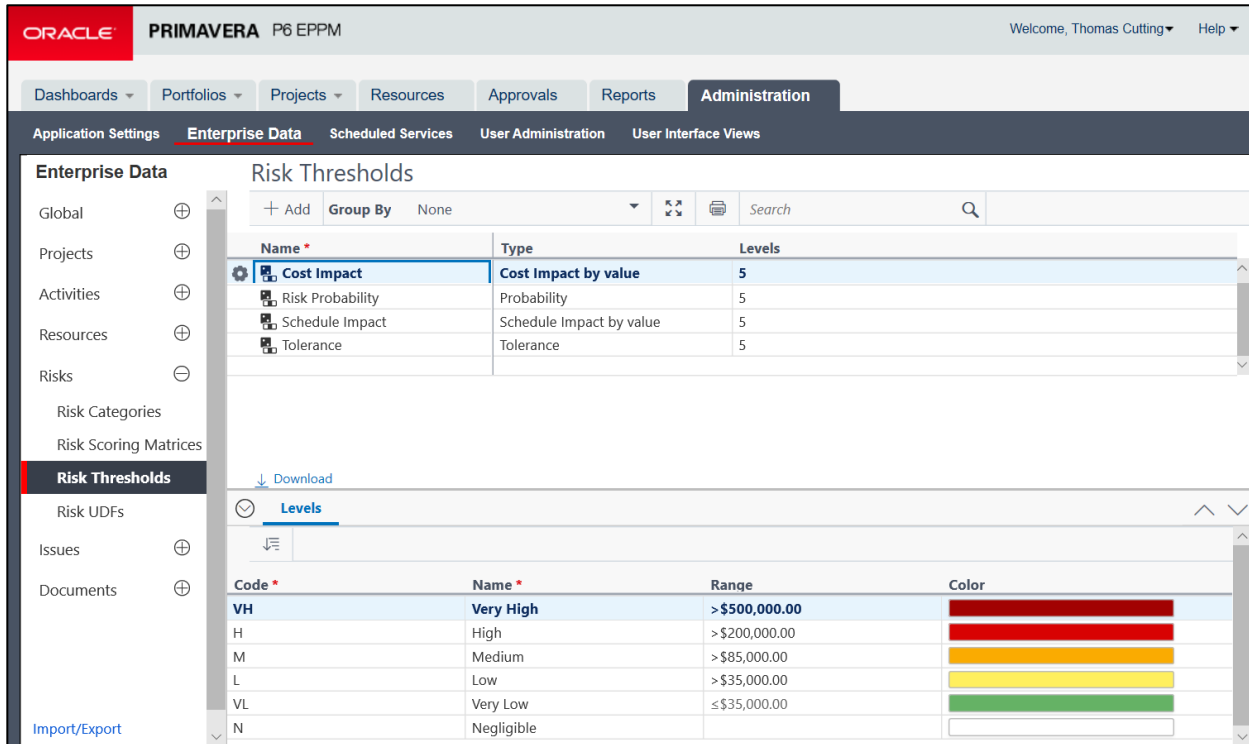
Not all risks identified will warrant a plan of action, but ones that remain unidentified can seriously impact the project.

## Perform Qualitative Risk Analysis

Qualitative Risk Analysis prioritizes risks based on a pre-defined rating scale. This is accomplished by estimating the **Probability** of the risk occurring as well as the **Impact** to cost and schedule that it represents. Probability and Impact are measured on a scale of 1 to 5, Low to High, or some variation of that theme. These are used in a **Risk Matrix** to determine a **Risk Score**.

Probabilities and Impacts are defined in the Administration tab on the Enterprise Data window under Risk Thresholds.

# MANAGING RISKS IN P6 EPPM









**Enterprise Data**

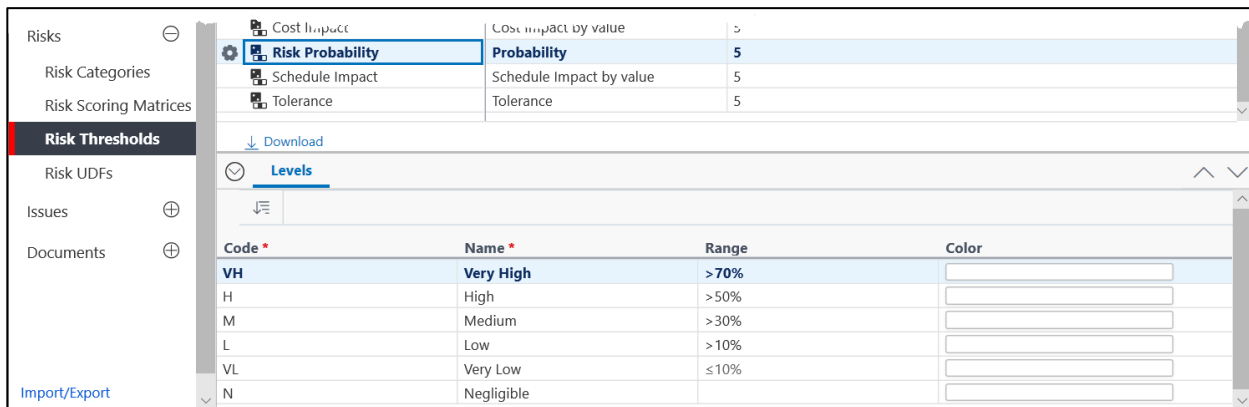
**Risk Thresholds**

Name *	Type	Levels
<b>Cost Impact</b>	<b>Cost Impact by value</b>	<b>5</b>
Risk Probability	Probability	5
Schedule Impact	Schedule Impact by value	5
Tolerance	Tolerance	5

**Levels**

Code *	Name *	Range	Color
<b>VH</b>	<b>Very High</b>	<b>&gt;\$500,000.00</b>	
H	High	>\$200,000.00	
M	Medium	>\$85,000.00	
L	Low	>\$35,000.00	
VL	Very Low	≤\$35,000.00	
N	Negligible		

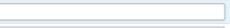





In the example below, Probability is measured from Negligible to Very High with ranges based on the percent chance that the risk will happen.



**Risk Thresholds**

Name *	Type	Levels
<b>Risk Probability</b>	<b>Probability</b>	<b>5</b>
Schedule Impact	Schedule Impact by value	5
Tolerance	Tolerance	5

**Levels**

Code *	Name *	Range	Color
<b>VH</b>	<b>Very High</b>	<b>&gt;70%</b>	
H	High	>50%	
M	Medium	>30%	
L	Low	>10%	
VL	Very Low	≤10%	
N	Negligible		

# MANAGING RISKS IN P6 EPPM

Schedule impact range is typically measured in the number of days the project would be delayed. Below the scale is Negligible to Very High, but the range shows < 5 to > 40.

Risks	Cost Impact	Cost impact by value	>
Risk Categories	Risk Probability	Probability	5
Risk Scoring Matrices	<b>Schedule Impact</b>	<b>Schedule Impact by value</b>	<b>5</b>
<b>Risk Thresholds</b>	Tolerance	Tolerance	5
Risk UDFs	Download		
Issues	Levels		
Documents			
Import/Export			

Code *	Name *	Range	Color
VH	Very High	> 40	
H	High	> 20	
M	Medium	> 10	
L	Low	> 5	
VL	Very Low	≤ 5	
N	Negligible		

The Cost Impact range is measured in dollars from Negligible to Very High.

Resources	Cost Impact	Cost impact by value	5
Risks	Risk Probability	Probability	5
Risk Categories	Schedule Impact	Schedule Impact by value	5
Risk Scoring Matrices	Tolerance	Tolerance	5
<b>Risk Thresholds</b>	Download		
Risk UDFs	Levels		
Issues			
Documents			
Import/Export Enterprise			

Code *	Name *	Range	Color
VH	Very High	> \$500,000.00	
H	High	> \$200,000.00	
M	Medium	> \$85,000.00	
L	Low	> \$35,000.00	
VL	Very Low	≤ \$35,000.00	
N	Negligible		

The Probability and Impacts can then be assigned to each risk.

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Risks of Rebrand Store 1034

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ID *	Name	Type	Status	Owner	Probability	Schedule	Cost	Score
<div><div></div><div>Rebrand Store 1034</div></div>								
<div><div></div><div>R0024</div></div>	Outdated electrical service	Threat	Proposed	Electrical Engineering ...	<div>H (50% t...</div>	H (20d to 40d)	L (\$35,000.00...	
					<div>VH (70% or higher)</div>			
					<div>H (50% to 70%)</div>			
					<div>M (30% to 50%)</div>			
					<div>L (10% to 30%)</div>			
					<div>VL (Up to 10%)</div>			
					<div>N (Negligible)</div>			

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# MANAGING RISKS IN P6 EPPM

Probability and Impact thresholds are combined in a Risk Matrix that defines the Risk Score for each Probability / Impact selection.

**Risk Scoring Matrices**

Name *	Matrix Size	Probability Threshold *	Cost Impact Threshold *	Schedule Impact Threshold *	Tolerance Threshold *
DRM Scoring Matrix	5 x 5	Risk Probability	Cost Impact	Schedule Impact	Tolerance
3X Risk Scoring Matrix	3 x 3	3L Probability	3L Cost Impact	3L Schedule Impact	3L Tolerance
<b>Univ Tire Scoring Matrix</b>	<b>5 x 5</b>	<b>Risk Probability</b>	<b>Cost Impact</b>	<b>Schedule Impact</b>	<b>Tolerance</b>

**Probability and Impact Diagram**

Probability	Severity 1	Severity 2	Severity 3	Severity 4	Severity 5
Very High	6	12	18	36	72
High	4	7	14	28	56
Medium	3	5	10	20	40
Low	2	3	6	12	24
Very Low	1	1	2	4	8

In the example above 7 has been assigned to where the High Probability intersects with level 2 or Low Impact (Severity). The values in this table should be defined as part of the Risk Management Plan.

Each project can be assigned a single Risk Matrix.

Since P6 EPPM identifies both Schedule Impact and Cost Impact, this matrix uses the highest impact value to determine the Risk Score. So when the Probability is High, Schedule Impact is Low, and Cost Impact is High, based on the matrix above, the value would be 28 instead of 7.

## Perform Quantitative Risk Analysis

Qualitative Risk Analysis is a deeper dive into the impact the risks with the highest scores might have on the overall objectives of the project. Qualitative analysis typically is a time-consuming process and may require additional tools to perform. Tools and techniques used to perform the analysis include:

- 3-point Estimating – calculates the optimistic, most likely, and pessimistic estimates for the activities or deliverables that would be impacted by the risk. In P6 EPPM, 3 separate copies of the schedule can be created to perform “What If” scenarios and determine the different cost and schedule values.
- Decision Tree Analysis – creates a diagram showing the implications of the different alternatives. Each branch represents an action with sub-branches to estimate the impact with a good, moderate, or poor outcome. This would typically be done outside of P6.

# MANAGING RISKS IN P6 EPPM

- Monte Carlo Analysis – a complex mathematical simulation that calculates schedule and cost variances based on the probability of an event or risk occurring. For example, the project may require a large quantity of lumber and you have estimated an 80% probability that the price could jump during the project. This means that if the same project was executed 100 times, 80 of those times the price would jump and 20 times it won't. Monte Carlo Analysis calculates a projected cost that accounts for those variables. It runs scenarios that include multiple and overlapping risks like this to provide an overall projected cost and schedule. Specialized software would be required to perform this analysis.

## Plan Risk Response

A Risk Response Plan identifies what type of approach will be taken for each risk. That approach differs based nature of the risk and the probability and impact of the risk happening. There are four types of response:

1. Avoid – take different actions to reach the project objectives that don't have as high risk.
2. Transfer – shift the ownership of the risk by subcontracting it to a third party, locking in long term pricing on material, purchasing insurance against weather delays, or other actions.
3. Mitigate/Reduce – take actions that will either reduce the probability of the risk happening or the impact to the project if it does.
4. Accept – take no action and plan to absorb the impact if it happens. This is typically done if the probability or impact is low or the cost in time or money to do something about it is higher than the risk impact.

P6 EPPM records the risk response and identifies actions to be planned, assigned, and tracked in the Response Plans tab (G below) in the details area for each risk.

**Risks of Rebrand Store 1034**

ID *	Name	Type	Status	Owner	Probability	Schedule	Cost	Score
R0024	Outdated electrical service	Threat	Open	Electrical Engineering ...	H (50% to 70%)	H (20d to 40d)	L (\$35,000.00...	

**Response Plans**

ID *	Name	Active	Response Type	Owner	Status	Start	Finish	Probability	Schedule
R0024-ACCPT	Accept Electrical Risk	<input type="checkbox"/>	Accept			11-18-19	12-31-19	H (50% to 70%)	H (20d to 40d)
001	Wait for impact	<input type="checkbox"/>				11-18-19	12-31-19	H (50% to 70%)	H (20d to 40d)
R0024-RED	Reduce Electrical Risk	<input checked="" type="checkbox"/>	Reduce	Electrical Repai...	Proposed	11-18-19	12-31-19	H (50% to 70%)	VL (Up to 5d)
002	Order an inspection	<input type="checkbox"/>			In-Progress	11-18-19	12-06-19	H (50% to 70%)	H (20d to 40d)
003	Replace electrical service	<input type="checkbox"/>			Proposed	12-09-19	12-31-19	H (50% to 70%)	VL (Up to 5d)

# MANAGING RISKS IN P6 EPPM

For each risk, multiple response plans can be created and assigned a Response Type (H) of Accept, Avoid, Transfer, or Reduce. Specific actions (I) plan out what is to be done when (J) and how the Probability and Impact (K) are altered if those actions are taken.

Each potential Response Plan is identified and detailed to the level needed to decide on which plan is the best option.

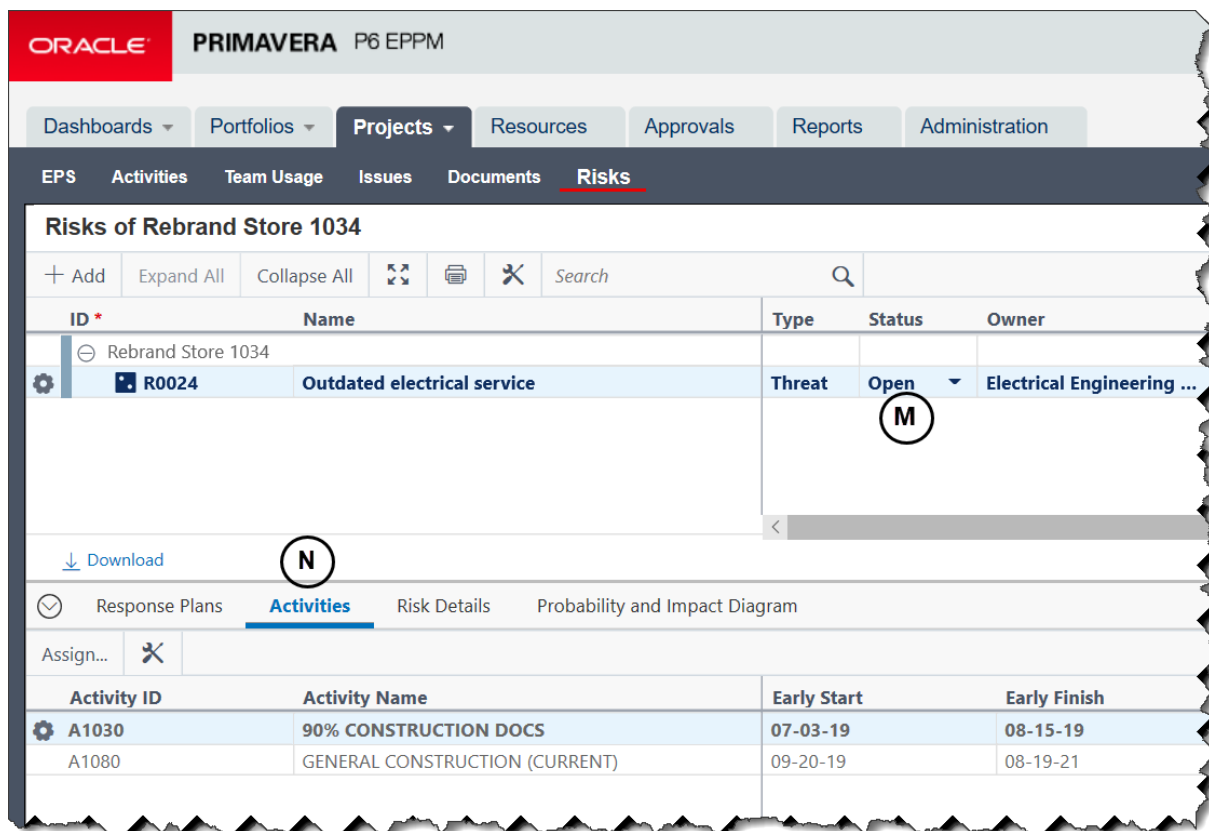
## Implement Risk Response

Once a Response Plan is chosen, the Active (L) checkbox is selected and the response is put into action.

## Monitor Risks

Risks need to be actively monitored and tracked. The status of existing risks (M) should be updated from Proposed to Open as they are accepted and then to Active when they are being executed.

Risks can be assigned to specific Activities (N) to tie them to points in the schedule, helping track the timing and impact.



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**Risks of Rebrand Store 1034**

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ID *	Name	Type	Status	Owner
Rebrand Store 1034				
R0024	Outdated electrical service	Threat	Open	Electrical Engineering ...

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Response Plans **Activities** Risk Details Probability and Impact Diagram

Assign...

Activity ID	Activity Name	Early Start	Early Finish
A1030	90% CONSTRUCTION DOCS	07-03-19	08-15-19
A1080	GENERAL CONSTRUCTION (CURRENT)	09-20-19	08-19-21

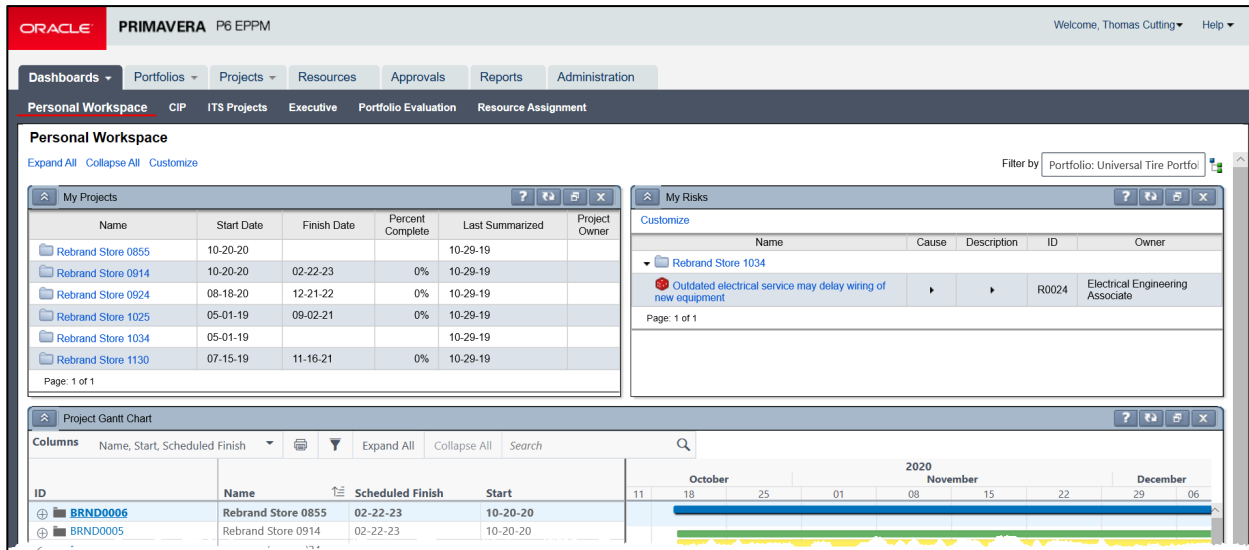
Regularly each existing status should be reviewed to determine if the Probability or Impact has changed as well as if the Response should be altered. Risks that are no longer a threat can be closed and new risks should be identified and added to the risk registry.



# MANAGING RISKS IN P6 EPPM

P6 EPPM provides status values of Proposed, Open, Active, Rejected (Closed), Managed (Closed), and Impacted (Closed). How and when these are used should be identified in the Project Risk Management Plan.

Risks can be displayed on a Dashboard and filtered by status.



Ultimately, how risks are managed within the project can determine success or failure. Using P6 EPPM's Risk Management functionality will help reduce the chance of things going bad and the impact if they do.