Operations Project Authorization Form

Approved at July 18, 2018 EPAC

Link to Meeting Minutes

Date Prepared: 04/17/2018	**Project Title: Feeder Fault Detector**
Company/ies: Eversource CT	**Project ID Number: CS00318**
Organization: Asset Management	**Class(es) of Plant: Distribution Substation**
Project Initiator: [redacted]	**Project Category: General Modernization**
Project Manager: [redacted]	**Project Type: Specific**
Project Sponsor: [redacted]	**Project Purpose: Cable fault detection**
Estimated in service date: March 2019	**If Transmission Project: N/A**
Eng. /Constr. Resources Budgeted? Yes	**Capital Investment Part of Original Operating Plan? Y**
Authorization Type: Full Funding	**O&M Expenses Part of the Original Operating Plan? N**
Total Request: $578,442	

Financial Requirements:

Project Authorization

ERM: _____

FP&A: _____

Executive Summary

This project is seeking full funding of $578,442 to purchase [redacted] Success in this case is measured in reduced outage times affecting both SAIDI and CAIDI.

The fault locating software benefits will include:

- Reduce time to locate and repair faults
- Identify problem areas of a circuit
- Identify fault causes and problem conditions
- Improve reliability
- Extend life of the cable

Project Costs Summary

	Prior Authorized	2018	2019	Totals
Capital Additions - Direct	**$** 0	$471,270	$85,712	$556,982
Less Customer Contribution	$ 0	$0	$0	$0
Removals net of Salvage ____%	$ 0	$0	$0	$0
Total - Direct Spending	$ 0	$471,270	$85,712	$556,982
Capital Additions - Indirect	$ 0	$8,697	$7,036	$15,733
Subtotal Request	$ 0	$479,967	$92,748	$572,715
AFUDC	$ 0	$3,109	$2,618	$5,727
Total Capital Request	$ 0	$483,076	$95,366	$578,442
O&M	$ 0	$0	$0	$0
Total Request	**$ 0**	**$483,076**	**$95,366**	**$578,442**

Financial Evaluation

Direct Capital Costs	2018	2019	Total
Straight Time Labor	$9,345	$7,561	$16,907
Overtime Labor	$0	$0	$0
Outside Services	$284,155	$77,274	$361,429
Materials (Software purchase)	$177,770	$877	$178,647
Other, including contingency amounts (describe)	$0	$0	$0
Total	**$471,270**	**$85,712**	**$556,982**

Indirect Capital Costs	2018	2019	Total
Indirects/Overheads (including benefits)	$8,697	$7,036	$15,733
Capitalized interest or AFUDC, if any	$3,109	$2,618	$5,727
Total	**$11,805**	**$9,655**	**$21,460**

Total Capital Costs	**$483,076**	**$95,367**	**$578,442**
Less Total Customer Contribution	$0	$0	$0
Total Capital Project Costs	**$483,076**	**$95,367**	**$578,442**
Total O&M Project Costs	$0	$0	$0

Note: Explain unique payment provisions, if applicable
In the table above, materials refers to purchasing of the required software.

Future Financial Impacts:

Provide below the estimated future costs that will result from the project:
:

Future Costs	2018	2019	2020	2021+	Total Future Project Costs
Capital	$ -	$ -	$ -	$ -	$ -
O&M	$0	$11,470	$13,764	$13,709	$38,943
Other	-	-	-	-	-
TOTAL	**$ -**	**$ 11,470**	**$ 13,764**	**$ 13,709**	**$ 38,943**

Describe the estimated future Capital, O&M and/or Other costs noted above:
The above costs are associated with the ongoing IT support and licensing for the required software.

What functional area(s) will these future costs be funded in?
The project will pay for the first three (3) years for software and engineering services. We expect to figure out and debug any issues within the first 3 years of the system in place. After the first 3 years the software maintenance cost will be IT responsibility (per [redacted] agreement) and the advance engineering services if still needed will be operations responsibility.

A representative from the respective functional area is required to be included as a project approver.

If this is other than a Reliability Project, please complete the section below;

Provide below the estimated financial benefits that will result from the project:
Note: Dollar values are in thousands:

Future Benefits	Year 20__	Year 20__	Year20__	Year 20__+	Total Future Project Benefits
Capital	$ -	$ -	$ -	$ -	$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Describe the estimated future Capital, O&M and/or Other benefits noted above: N/A

What functional area(s) will these benefits be reflected in?_____
A representative from the respective functional area is required to be included as a project approver.

Asset Retirement Obligation (ARO) and/ or Environmental Cleanup Costs (Environmental Liabilities):

Is there an ARO associated with this project? If yes, please provide details:

Are there other environmental cleanup costs associated with this project? If yes, please provide details:

Technical Justification:

Project Need Statement

[redacted] An example of how the pilot worked is shown below on page 9.

Project Objectives

To quickly identify, locate and repair underground faults, limiting customer outage times.

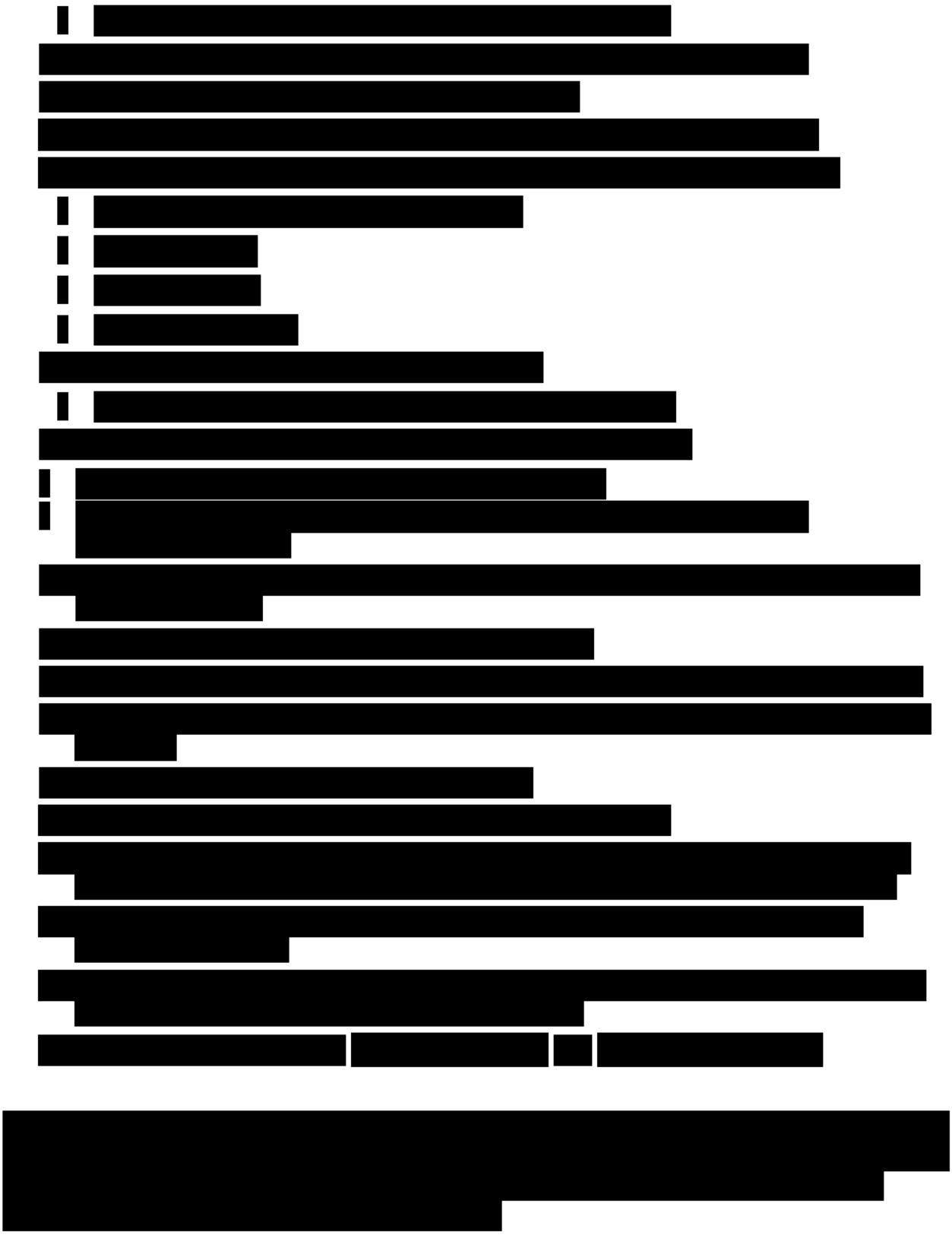
- **Reduce time to repair faults:** Fault location will help identify problem equipment, such as cable splices, insulators, etc. and allow repair of the equipment much faster than using traditional methods to locate the faults. This should have a positive effect on SAIDI values for the feeders where automatic fault location is implemented.
- **Identify problem areas of a circuit**: Associating fault locations with each event will help identify portions of the circuit that are experiencing multiple faults over time. This is particularly important for temporary faults that could be an indication of a problem that will result in a permanent fault.
- **Identify fault causes and problem conditions**: Fault location can be used along with other information to help determine the fault cause and problem conditions.
- **Improve reliability**: The ultimate benefit is actual reliability improvement. Reduced number of faults through identification of problems ahead of time and reduced time to repair will both improve overall electric system reliability.
- **Extend life of the cable:** Traditional fault location methods stress the cable. This pilot will provide approximate fault location which will reduce actual testing.
- Also, utilize the new PQView software to monitor LTC on the transformers.

Project Scope

[redacted]

Background / Justification

[redacted]



Business Process and / or Technical Improvements:

[redacted]

Alternatives Considered

[redacted]

Project Schedule

Milestone/Phase Name	Estimated Completion Date
Software Engineering	July 2018
Project start	September, 2018
Installation completion	March, 2019

Regulatory Approvals

N/A

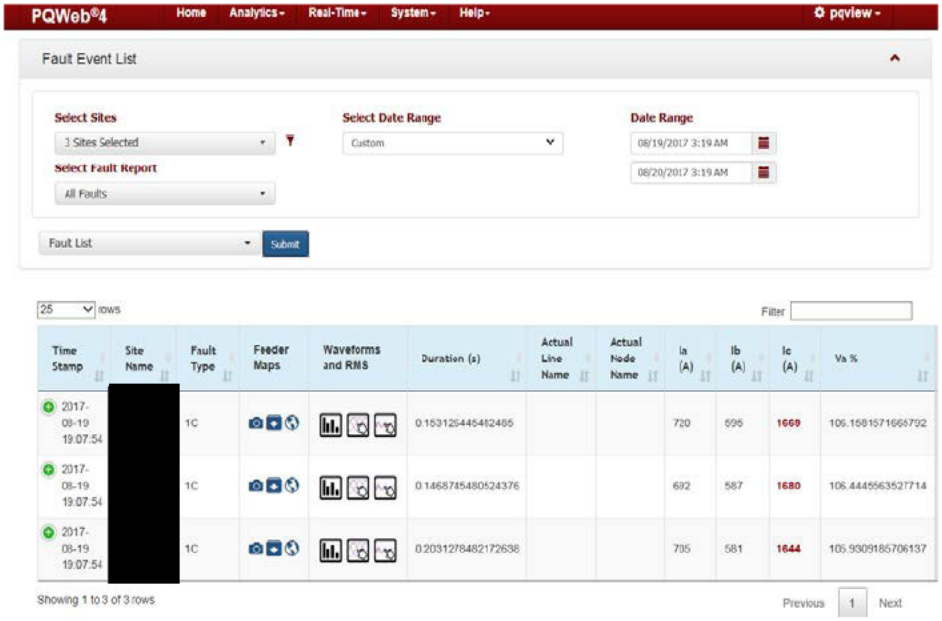
Risks and Risk Mitigation Plans

Risk Event	Risk Horizon	Likelihood of Occurrence	Expected Value Cost Exposure ($M)	Risk Mitigation
Actual cost higher than estimated due to scope changes.	2018	Low	Project Cost x Risk Factor	A detailed estimate was created for this project to outline all associated work.
Internal engineering/IT resources not available to perform the work.	2018	High	Labor cost x Outside Labor Premium	IT may not have the resources to support this project. Project will be subcontracted out to a vendor
Technological risks involving integration of modern technology	2018	Medium	Estimate of time and cost addition for difficulties involved with integration	The fault locator software is a new interface software to Eversource. The software did run properly during the pilot stage. The 8 substations that were picked for this project have the infrastructure needed in the substations already. There is always the risk that a few of the ION meters in the substation might need upgrading.

References

Example of pilot success

Example 1: Operator Selects Fault Event (Feeder and Date/Time).



6

Pilot, [redacted] Event 3408061, In the Red zone



7

Fault was located in less than 2 hrs. with the help of the pilot software.

Attachments (One-Line Diagrams, Images, etc.)

Fault Locator Pilot Project - System Overview



Project Checklist – Transmission and Substation

INSTRUCTIONS:
It is the responsibility of the initiator to contact the area disciplines to determine if the project considerations contained in this list are applicable to their project. They should fill out the checklist and determine a transition plan for the purpose of project execution.

Checklist for Studies and Processes of a Transmission & Substation Capital Project					
Project Name : Feeder Fault Detector Software					**PAF No: CS00318**
Facility Type: ☐ BPS	☐ BES	☐ PTF	☐ non-PTF	☐ CIP	☒ Distribution
PLANNING					
Is a NX-9 required?					No
Is an ISO-NE PAC presentation required?					No
Is a PPA required?					No
Is a TCA Application Required?					No
PLANNING/PROTECTION & CONTROLS					
Are RAS/SPS/UVLs affected?					No
OPERATIONS					
Outage Required?	☐ Primary Equipment (Power Transfer)		☒ Secondary Equipment (P&C only)		☒ Outage Not Required
Do SCLL Conditions Exist?					No
Has an outage schedule been approved?					NR
Are Operations & Maintenance procedures/training required?					Yes
STANDARDS					
Does the project include standard equipment and designs?					No
SUBSTATION ENGINEERING					
Does this impact Revenue Metering					No
Is preliminary short circuit/ breaker duty analysis required?					No
Are there any changes to the baseline audible noise?					No
Is there an impact to the existing ground grid?					No
Is a Transient Over Voltage (TOV) analysis required?					No
P&C ENGINEERING					
OP-22 - Are PMUs and DDR required?					No
If BPS, is an NPCC Directory #4 presentation required?					No

Checklist for Studies and Processes of a Transmission & Substation Capital Project	
Project Name : Feeder Fault Detector Software	**PAF No: CS00318**
TRANSMISSION LINE ENGINEERING	
Are there any changes that affect the baseline EMF?	No
Are there any changes that affect the baseline EMI?	No
Is there an impact to the existing ground grid?	No
SITING	
Is a Siting filing required?	No
PERMITTING	
Is there any permitting required?	No
Siting & Construction Services (Outreach)	
What is the level of outreach expected?	None
INITIATOR	
Has a field constructability review been completed?	Yes
INVESTMENT RECOVERY	
Does the project require development of an Investment Recovery plan?	No
COST ESTIMATING	
How was the cost estimate prepared?	Other (specify below)
Who prepared the estimate?	OTHER
Was the estimate reviewed by Eversource Estimating?	No

Cost Estimate Backup Details

The project estimated cost is $578,442. The cost estimate was based on vendor's quote plus Eversource loaders. Also, licenses being purchased are corporate licenses, which means NH and MA can utilize the same program, Eversource will not need to re-purchase these licenses. Total cost for the corporate licenses are $143,920

<Distribution Fault Location Project Using PQVIEW>

Preparer: [redacted]
Last Update: 6/28/18
Starting Month: 201810

Architecture Score: n/a (range from 0-3)
Testing Score: 4 (range from 4-100)
OCM Score: TBD

[View PAF Tables] [View Financial Summary] Depreciation Term: 5 years

[View CBA] [View Infrastructure Requirements]

Cost Category / Role	Description & Comments	PAF Category	Track	Rate	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL PROJECT
					$0	$0	$0	$0	$0	$0	$0	$0	w/ Tax % - .0339
Capital - Vendor Costs													
[redacted]		Software		n/a	$101,239	$0	$0	$0					$101,239
		Software		n/a	$16,542	$0	$0	$0					$16,542
		Software		n/a	$15,922	$0	$0	$0					$15,922
		Software		n/a	$31,017	$0	$0	$0					$31,017
		Software		n/a	$0	$0	$0	$0					$0
		Outside Services		n/a	$28,991	$0	$0	$0					$28,991
		Outside Services		n/a	$57,652	$0	$0	$0					$57,652
		Outside Services			$85,396	$0	$0	$0					$85,396
<add rows above as needed then copy formulas to new row prior to using>													
		Subtotal Vendor			**$336,760**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$336,760**
Capital - Supplier Costs													
[redacted]		Hardware		n/a	$2,215	$0	$0	$0					$2,215
		Software		n/a	$2,215	$0	$0	$0					$2,215
		Software		n/a	$2,647	$0	$0	$0					$2,647
		Hardware		n/a	$285	$571	$0	$0					$856
		Hardware		n/a	$153	$306	$0	$0					$459
		Hardware		n/a	$5,534	$0	$0	$0					$5,534
					$0	$0	$0	$0					
<add rows above as needed then copy formulas to new row prior to using>													
		Subtotal Supplier			**$13,049**	**$877**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$13,926**
Capital - Contractor Costs				Rate									
Contractor - Enterprise Architect	TBD	Outside Services		$175	$7,961	$5,356	$0	$0					$13,317
Contractor - Solutions Architect	TBD	Outside Services		$175	$39,805	$26,778	$0	$0					$66,583
Contractor - Security Architect	TBD	Outside Services		$220	$25,020	$16,832	$0	$0					$41,852
		Outside Services		$0	$0	$0	$0	$0					$0
Contractor - Project Manager	TBD	Outside Services		$150	$34,119	$22,953	$0	$0					$57,071
Contractor - Other	Database Administrator	Outside Services		$175	$5,211	$5,356	$0	$0					$10,566
		Outside Services		$0	$0	$0	$0	$0					$0
		Outside Services		$0	$0	$0	$0	$0					$0
<add rows above as needed then copy formulas to new row prior to using>													
		Subtotal Contractor			**$112,116**	**$77,274**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$189,390**
		Total External Eversource Costs			**$461,925**	**$78,150**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$540,075**
Capital - Internal Labor Costs				Rate									
Business SME	J Grorl	Internal Labor		$46	$3,357	$2,007	$0	$0					$5,365
IT Security Engineer	TBD	Internal Labor		$42	$1,836	$1,235	$0	$0					$3,071
IT Business Solutions Analyst (BSA)	TBD	Internal Labor		$48	$1,740	$708	$0	$0					$2,448
Network Analyst	TBD	Internal Labor		$41	$2,411	$2,444	$0	$0					$4,856
Business Client / Analyst, Tester	TBD	Internal Labor		$41	$0	$1,167	$0	$0					$1,167
		Internal Labor		$0	$0	$0	$0	$0					$0
		Internal Labor		$0	$0	$0	$0	$0					$0
		Internal Labor		$0	$0	$0	$0	$0					$0
<add rows above as needed then copy formulas to new row prior to using>													
		Subtotal Internal Labor			**$9,345**	**$7,561**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$16,907**
Capital - Employee Expense Costs													
		Internal Labor		n/a	$0	$0	$0	$0					$0
		Internal Labor		n/a	$0	$0	$0	$0					$0
		Internal Labor		n/a	$0	$0	$0	$0					$0
<add rows above as needed then copy formulas to new row prior to using>													
		Subtotal Employee Expenses			**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
		Total Internal Labor Costs			**$9,345**	**$7,561**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$16,907**
Baseline Direct Budget					**$471,270**	**$85,712**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$556,982**
Indirect Charges		PAF Category											
Include	NonProductive (ZNP)	Indirects		16.8%	$1,569	$1,270	$0	$0	$0	$0	$0	$0	$2,839
Include	Payroll Benefits (ZGS - ESCo; ZPB - OpCo)	Indirects		65.3%	$7,127	$5,767	$0	$0	$0	$0	$0	$0	$12,894
	Capital Subtotal				$479,967	$92,748	$0	$0	$0	$0	$0	$0	$572,715

<Distribution Fault Location Project Using PQVIEW>

Preparer: [redacted]
Last Update: 6/28/18
Starting Month: 201810

Architecture Score: n/a (range from 0-3)
Testing Score: 4 (range from 4-100)
OCM Score: TBD

View PAF Tables | View Financial Summary | Depreciation Term: 5 years

View CBA | View Infrastructure Requirements

					$0	$0	$0	$0	$0	$0	$0	$0	w/ Tax % - .0339
Do not include	Admin & Supervision (ZAS)		Indirects	0.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Capital Cumulative												
Include	AFUDC		Indirects	1.0%	$3,109	$2,618	$0	$0	$0	$0	$0	$0	$5,727
	Total Indirects			127%	$11,805	$9,655	$0	$0	$0	$0	$0	$0	$21,460

													Includes tax
Total Capital Budget w/o Contingency					$483,076	$95,367	$0	$0	$0	$0	$0	$0	$578,442
	Contingency			0%	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Capital Budget with Contingency					$483,076	$95,367	$0	$0	$0	$0	$0	$0	$578,442

O&M BUDGET — TOTAL PROJECT

Project O&M		Manager	CCC										Includes tax (if applicable)
					$0	$0	$0	$0					$0
					$0	$0	$0	$0					$0
					$0	$0	$0	$0					$0
					$0	$0	$0	$0					$0
					$0	$0	$0	$0					$0
<add rows above as needed then copy formulas to new row prior to using>													
		Project O&M Total			$0	$0	$0	$0	$0	$0	$0	$0	$0

Includes tax

TOTAL PROJECT COSTS $578,442

ESTIMATION CONFIDENCE LEVEL: 30%

High Side: $983,352
Low Side: $173,533

Future O&M		Manager	CCC										Includes tax (if applicable)
IT Infrastructure Supplier Services	Server Maintenance (CPU & Memory for 8 VM Servers @$77/mo/server				$0	$6,160	$7,392	$7,392					$20,944
IT Infrastructure Supplier Services	RU Database Support $190.91/mo x 2 DBs				$0	$3,800	$4,560	$4,560					$12,920
IT Infrastructure Supplier Services	VM Storage for 2 Prod Machines replicated				$0	$570	$684	$628					$1,882
IT Infrastructure Supplier Services	VM Storage for 2 Prod SQL Server & Web Server				$0	$570	$684	$685					$1,939
IT Infrastructure Supplier Services	VM Storage for 4 Non-Prod SQL Server.				$0	$370	$444	$444					$1,258
<add rows above as needed then copy formulas to new row prior to using>													
		Future O&M Total			$0	$11,470	$13,764	$13,709	$0	$0	$0	$0	$38,943
Total O&M Budget					$0	$11,470	$13,764	$13,709	$0	$0	$0	$0	$38,943

Overall Comments/Notes (assumptions used, etc)

Assume most of the work done by Electrotek staff/team lead
Assume it will be a 6 month project (if not sooner)
Assume minimal amount of interaction by the team lead (Jorin)
Assume testing to be done by Jorin or another engineer
If we add the new PQ View version we can cancell the cost for the old PQ view and Server and discontinue the old server and transport the data to the new database server (monthly savings).
Assume that the two new virtual machines production machines for primary & back-up will have failover capability (redundancy)
Assume that the 200 Schneider Electric Ion Meters will be downloaded to the pilot dev server.
Based on conversation with Kevin of Electrotek on 5/10/18, as long as we remain current and licensed, should not cost for stagin machines.
Spoke with Archisman from Infosys ono 5/10/18; would need separate server for web today because logon to application is not standard.
Per converstaion with E. Daggett on 5/14/18 - We have one time VM costs and then monthly RU storage and backup costs per TB.

<Expand at left to view comments. Insert additional rows as needed within the above green area>