ELECTRIC VEHICLE CHARGING STATION INFRASTRUCTURE PROJECT FOR NEW JERSEY

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AGENDA

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- PROJECT CHARTER
- SCOPE BASELINE
- COST BASELINE
- SCHEDULE BASELINE
- EARNED VALUE MANAGEMENT
- RISK MANAGEMENT
- CHANGE CONTROL MANAGEMENT
- CONCLUSION

INTRODUCTION

INTRODUCTION

- EV charging stations require co-ordinated construction, has to be widespread and needs careful planning
- This project will cover major metropolitan areas of New Jersey and would help commuters travel hassle free
- This project is initiated to implement the multi-state Zero Emissions Vehicle Act Plan
- Implemented to help EV owners to save on installing a private charging, instead providing charging stations at various locations
- Seeing where the world is going, by eliminating fossil fuels and shifting towards electricity gives us high confidence that this project will never become a WHITE ELEPHANT

PROJECT SELECTION CRITERIA

NOMINAL GROUP TECHNIQUE

No.	Project Ideas	P1	P2	P3	P4	Total
1	Electric Vehicle Charging Station Infrastructure Project	1	1	1	1	4
2	JP Morgan, Quantum Computing Project	0	1	1	1	3
3	The Oxygen Bar Project	1	0	1	0	2
4	State Route 520 Floating Bridge Project	1	1	0	1	3

PRIORITY MATRIX

Using priority matrix to come up with the most important locations for the implementation of EV stations in New Jersey

PRIORITY	LOCATION	AVERAGE TEAM SCORE
High	Newark	9.8
High	Jersey City	9.7
High	Trenton	9.7
High	Elizabeth	9.5
Neutral	Paterson	8
Neutral	Toms River	7.7
Neutral	Atlantic City	6.9
Neutral	Camden	6.3
Neutral	Hoboken	6.0
Low	New Brunswick	5.5
Low	Clifton	5.1
Low	Union City	4.2
Low	Passaic	3.7

PROJECT CHARTER

PROJECT OBJECTIVE

- Construction of a network of Electric Vehicle Charging Stations across NJ to provide easy refueling to EV owners and to increase the area for EV usage in NJ

BUSINESS INTERESTS

- World is shifting from fossil fuel to electricity, this has greatly impacted the commuter population, since they are shifting from Conventional Vehicles to Electric Vehicles, this not only saves them costs for fuel but also significantly reduces the maintenance of the vehicle and also increases efficiency and the life of the engine. For this great change in present world, it is of great interest to construct EV Charging Stations to provide easy refueling to EV owners and this would indeed help in increasing the number of EV owner and transitively increasing Business of EV Charging Stations

- Project being located in NJ makes the Business Interest even stronger, since a lot of commuters live in NJ who have to travel to Penn, NY and other neighboring states frequently.

SCOPE

- Provide DC fast charging to eliminate long wait times for commuters
- Provide Charging Stations at major demanding cities in NJ, which include but are not limited to Newark, Jersey City, Trenton, Elizabeth
- Provide easy access and connectivity from neighboring Metropolitans
- Compact and easy to maintain Charging Stations.
- Will include a good infrastructure in case of weather hazards
- Provide a parking space alongside the charging portals to accommodate waiting commuters incase of heavy demand
- Additionally will include EV car services in case of emergency

CONSTRAINTS

- Should be completed by Fall 2022
- Should be Fire compliance and meet all other Legal requirements
- Should be completed within $5 million proposed budget

OUT OF SCOPE

- Would not be able to accommodate high number of heavy vehicle in increase demand
- Limited number of DC chargers would discourage commuters in rush hour
- Limitations when it comes to providing charging to water or air EVs

STAKEHOLDERS

- Rutgers Business School (Sponsor)
- Electric Vehicle owners
- State Government of New Jersey
- Residents of New Jersey
- Project Team

FUTURE SCOPE

- Portability can be an added benefit to the business interest in the coming future

SCOPE BASELINE

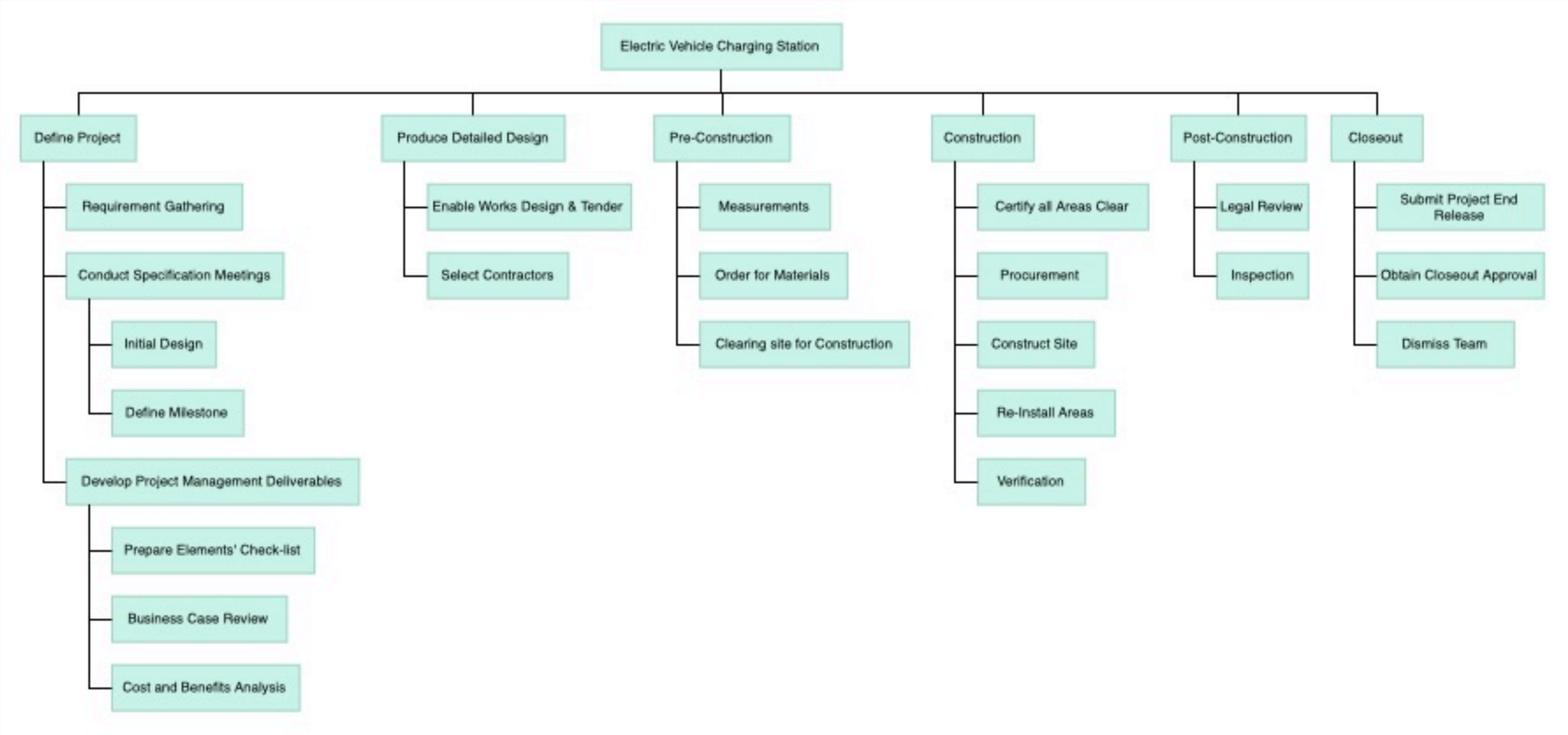
SCOPE STATEMENT

- EV Charging Stations will be constructed at different high priority locations In New Jersey to provide Electric Charging for EV owners. Further, we will also include perfect infrastructure for accommodation in rush hours and also during harsh weather conditions. Finally, the site would also be easy to maintain.

PROJECT DELIVERABLES

- Create Charging Portals for charging EVs along with a space allotted to accommodate the vehicle during charge time
- Create an additional parking space to accommodate waiting commuters
- Create DC charging portals for speed charging
- Create large charging spaces for heavy vehicles
- Develop a roof and strong infrastructure for time when weather is harsh

WORK BREAKDOWN STRUCTURE



WBS DICTIONARY

Work Breakdown Structure Dictionary with appropriate Levels, Code & name.

P.S. Description is not included due to space issues but has been implemented

WBS Level	WBS Code	WBS name
1	1	EV Charging Station
2	1.1	Define Project
3	1.1.1	Requirement Gathering
3	1.1.2	Conduct Speficiation Meetings
4	1.1.2.1	Initial Design
4	1.1.2.2	Define Milestone
3	1.1.3	Develop PM Deliverables
4	1.1.3.1	Prepare Elements' Check-list
4	1.1.3.2	Business Case Review
4	1.1.3.3	Cost & Benefits Analysis
2	1.2	Product Detailed Design
3	1.2.1	Enable Works Design & Tender
3	1.2.2	Select Contractors
2	1.3	Pre-Construction
3	1.3.1	Measurements
3	1.3.2	Order for Materials
3	1.3.3	Clearing site for Construction
2	1.4	Construction
3	1.4.1	Certify all Areas Clear
3	1.4.2	Procurement
3	1.4.3	Construct Site
3	1.4.4	Re-Install Areas
3	1.4.5	Verification
2	1.5	Post-Construction
3	1.5.1	Legal Review
3	1.5.2	Inspection
2	1.6	Closeout
3	1.6.1	Submit Project End Release
3	1.6.2	Obtain Closeout Approval
3	1.6.3	Dismiss Team

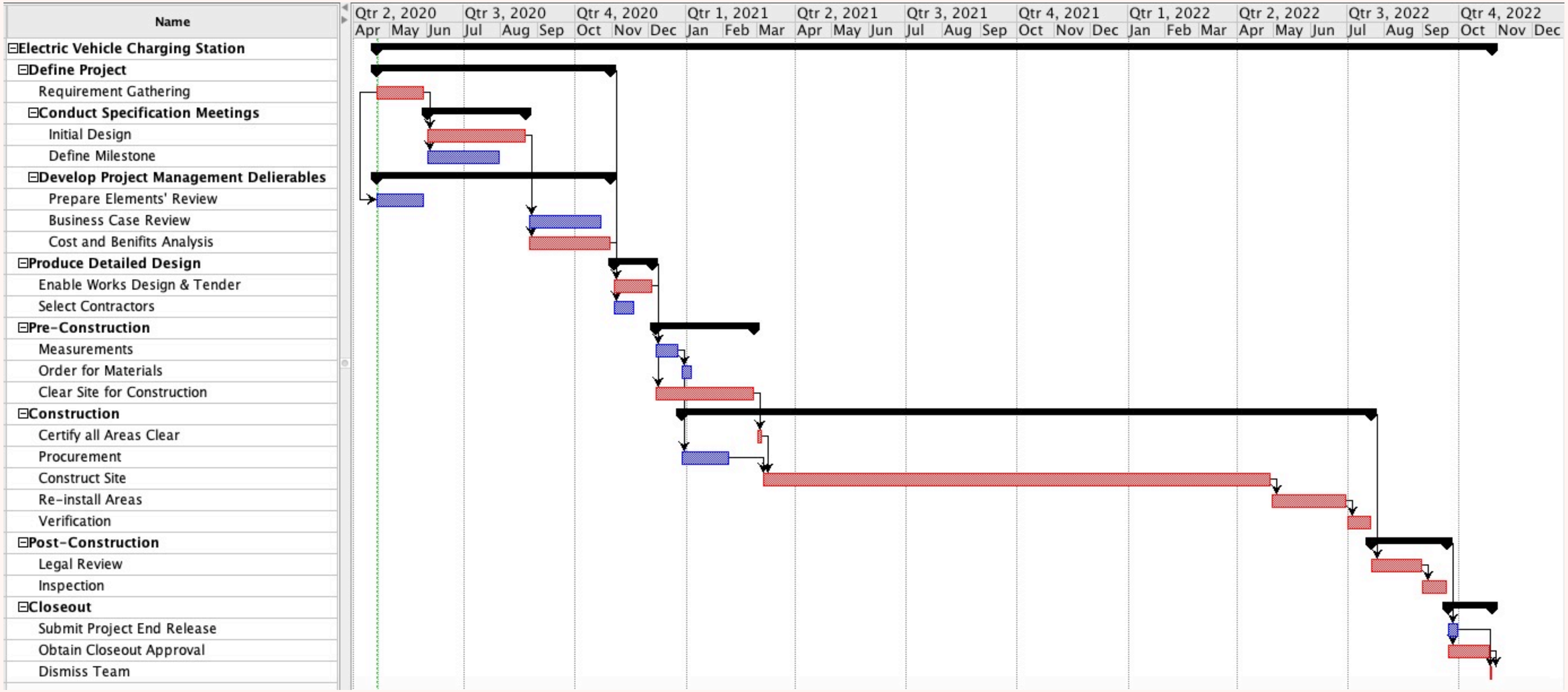
COST BASELINE

PROJECT BUDGET

Project Tasks	Project Sub-Tasks	Labour hours	Labour Cost	Material Cost	Travel Cost	Other cost	Total Per Task	Rate	Assignee
Define Project	Requirement Gathering	240	$ 28,800.00	$ -	$ -	$ -	$ 28,800.00	$120.00	PM
	Initial Design	480	$ 96,000.00	$ 500.00	$ 500.00	$ -	$ 97,000.00	$200.00	ENG
	Define Milestone	360	$ 43,200.00	$ -	$ -	$ -	$ 43,200.00	$120.00	PM
	Prepare Elements' Review	240	$ 28,800.00	$ -	$ -	$ -	$ 28,800.00	$120.00	PM
	Business Case Review	360	$ 43,200.00	$ -	$ 200.00	$ -	$ 43,400.00	$120.00	PM
	Cost and Benifits Analysis	400	$ 48,000.00	$ -	$ -	$ 500.00	$ 48,500.00	$120.00	PM
Subtotal							**$ 289,700.00**		
Produce Detailed Design	Enable Works Design & Tender	200	$ 40,000.00	$ 500.00	$ -	$ -	$ 40,500.00	$200.00	
	Contractors	112	$ 112,000.00	$ -	$ 7,000.00	$ -	$ 119,000.00	5/40 workers	
Subtotal							**$ 159,500.00**		
Pre-Construction	Measurements	120	$ 30,000.00	$ 5,000.00	$ 500.00	$ -	$ 35,500.00	5/10 workers	
	Order for Materials	56	$ -	$ 250,000.00	$ 8,000.00	$ -	$ 258,000.00	$0.00	
	Clear Site for Construction	480	$ 480,000.00	$ 30,000.00	$ 2,500.00	$ -	$ 512,500.00	5/40 workers	
Subtotal							**$ 806,000.00**		
Construction	Certify all Areas Clear	32	$ 4,800.00	$ 100.00	$ 1,000.00	$ 2,500.00	$ 8,400.00	$150.00	Law/Govt
	Procurement	240	$ -	$ 15,000.00	$ 15,000.00	$ -	$ 30,000.00	$0.00	
	Construct Site	2400	$ 2,400,000.00	$ 20,000.00	$ 10,000.00	$ 20,000.00	$ 2,450,000.00	5/40 workers	
	Re-install Areas	360	$ 360,000.00	$ 25,000.00	$ -	$ -	$ 385,000.00	5/40 workers	
	Verification	112	$ 13,440.00	$ 200.00	$ 500.00	$ -	$ 14,140.00	$120.00	
Subtotal							**$ 2,887,540.00**		
Post-Construction	Legal Review	240	$ 36,000.00	$ 200.00	$ 1,000.00	$ 2,000.00	$ 39,200.00	$150.00	Law/Govt
	Inspection	120	$ 18,000.00	$ 200.00	$ -	$ -	$ 18,200.00	$150.00	Law/Govt
Subtotal							**$ 57,400.00**		
Closeout	Submit Project End Release	56	$ 6,720.00	$ -	$ -	$ -	$ 6,720.00	$120.00	PM
	Obtain Closeout Approval	200	$ 24,000.00	$ -	$ 1,000.00	$ -	$ 25,000.00	$120.00	PM
	Dismiss Team	16	$ 1,920.00	$ -	$ 6,000.00	$ 500.00	$ 8,420.00	$120.00	PM
Subtotal							**$ 40,140.00**		
Total		6824					**$ 4,240,280.00**		

SCHEDULE BASELINE

GANTT CHART


Name
Electric Vehicle Charging Station
Define Project
Requirement Gathering
Conduct Specification Meetings
Initial Design
Define Milestone
Develop Project Management Delierables
Prepare Elements' Review
Business Case Review
Cost and Benifits Analysis
Produce Detailed Design
Enable Works Design & Tender
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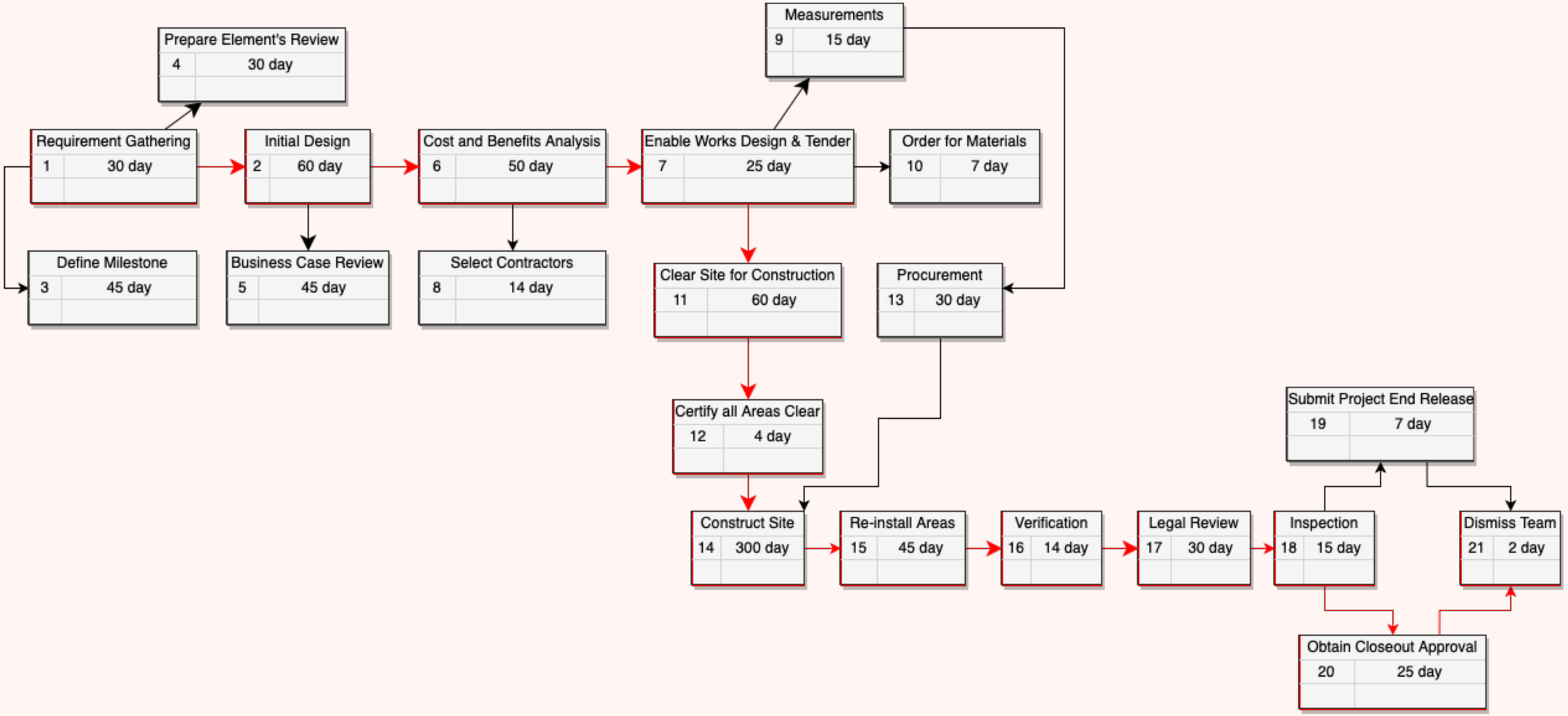
Legal Review
Inspection
Closeout
Submit Project End Release
Obtain Closeout Approval
Dismiss Team
Qtr 2, 2020
Qtr 3, 2020
Qtr 4, 2020
Qtr 1, 2021
Qtr 2, 2021
Qtr 3, 2021
Qtr 4, 2021
Qtr 1, 2022
Qtr 2, 2022
Qtr 3, 2022
Qtr 4, 2022
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

NETWORK DIAGRAM



EARNED VALUE MANAGEMENT

EARNED VALUE ANALYSIS

Planned Value (PV) or Budgeted Cost of Work Scheduled (BCWS)

WBS	Task Name	TBC	Q2' 2020	Q3' 2020	Q4' 2020	Q1' 2021	Q2' 2021	Q3' 2021	Q4' 2021	Q1' 2022	Q2' 2022	Q3' 2022	Q4' 2022	END
1.1	Define Project	289700	57,600	140,200	91,900									
1.2	Produce Detailed Design	159500			159,500									
1.3	Pre-Construction	806000			35,500	770,500								
1.4	Construction	2887540				38,400	980,000	735,000	245,000	490,000	385,000	14,140		
1.5	Post-Construction	57400										57,400		
1.6	Closeout	40140											40,140	
		0												
		0												
		0												
		0												
		0												
		0												
Insert new rows above this one														
	Total Budgeted Cost	**4240280**	57600	140200	286900	808900	980000	735000	245000	490000	385000	71540	40140	
	Cumulative Planned Value (PV)		57600	197800	484700	1293600	2273600	3008600	3253600	3743600	4128600	4200140	4240280	

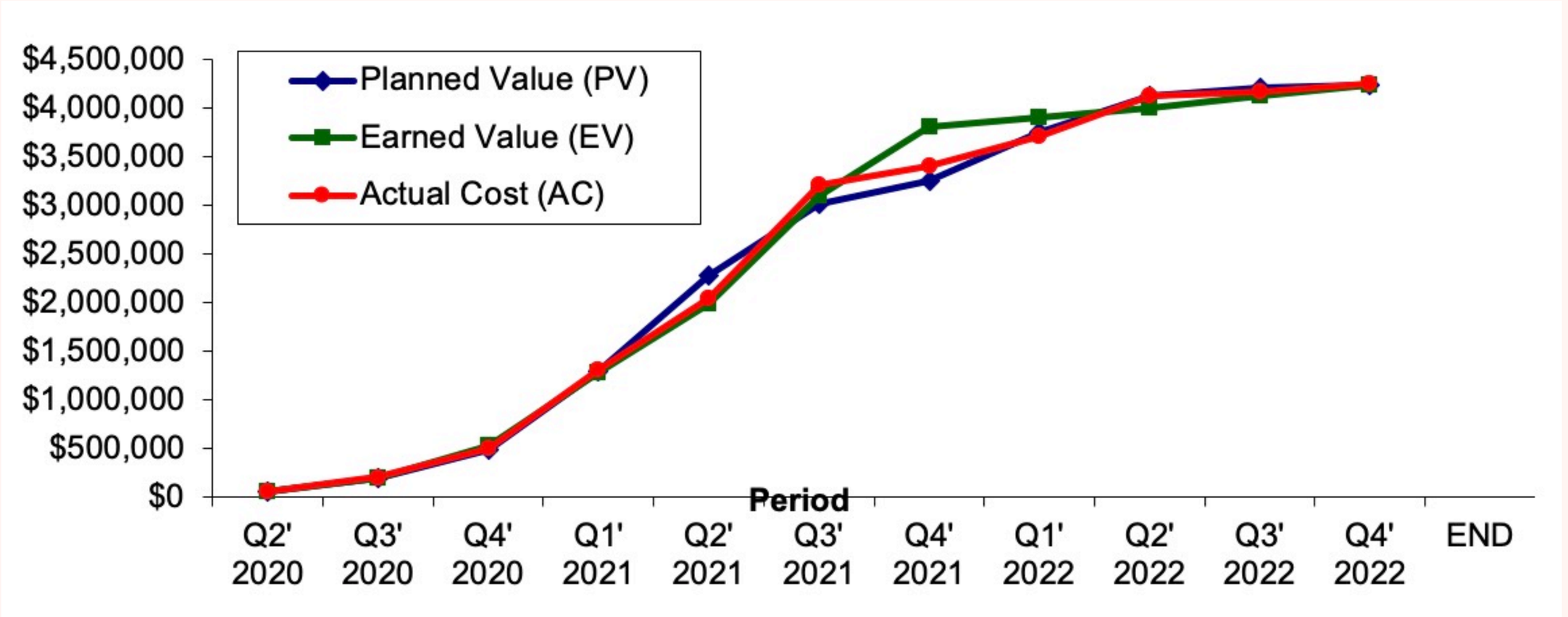
Actual Cost and Earned Value

Cumulative Actual Cost (AC)	60,000	200,000	500,000	1,300,000	2,042,840	3,204,000	3,406,000	3,700,000	4,130,000	4,170,000	4,241,800	
Cumulative Earned Value (EV)	55,000	190,000	520,000	1,280,000	1,982,000	3,100,000	3,802,000	3,900,000	4,000,000	4,128,000	4,240,280	

Project Performance Metrics

Cost Variance (CV = EV - AC)	-5000	-10000	20000	-20000	-60840	-104000	396000	200000	-130000	-42000	-1520	-
Schedule Variance (SV = EV - PV)	-2600	-7800	35300	-13600	-291600	91400	548400	156400	-128600	-72140	0	-
Cost Performance Index (CPI = EV/AC)	0.92	0.95	1.04	0.98	0.97	0.97	1.12	1.05	0.97	0.99	1.00	-
Schedule Performance Index (SPI = EV/PV)	0.95	0.96	1.07	0.99	0.87	1.03	1.17	1.04	0.97	0.98	1.00	-
Estimated Cost at Completion (EAC)	4625760	4463453	4077192	4306534	4370441	4382535	3798631	4022830	4378089	4283422	4241800	-

EARNED VALUE GRAPH



RISK MANAGEMENT

RISK RESPONSE MATRIX

"All of life is the Management of risk, not its elimination"

-Walter Wriston

Description	Category	Response	Trigger	Prob	Impact	Detection	Value	Owner
Permits	Scope/ Cost/ Schedule	Avoid		20%	$100,000	Before Const	High	Company
Land limitation	Resource	Avoid	x	20%	$5,000,000	Before Const	High	Company
Catastrophe	Scope/ Cost/ Schedule	Accept/ Mitigate		1%	$80,000,000	Anytime	High	Insurance
Changes in Laws	Scope/ Cost/ Schedule	Accept/ Mitigate		5%	$80,000	Anytime	Med	Company
Procurement failure	Resource	Avoid/ Mitigate/ Transfer		50%	$50,000	Before/ During Const	Med	Procurement Company
Faulty Design	Scope	Avoid	x	40%	$1,000,000	Before Const	High	Designer
Language barrier	Watch List	Avoid/ Mitigate	x	40%	$1,000	Before/ During Const	Low	Contractor
Injuries	Cost/ Schedule	Avoid/ Mitigate		70%	$20,000	Anytime	Med	Company/ Worker

CHANGE CONTROL MANAGEMENT

EXAMPLE OF A CHANGE

How to deal with it

There are high chance for a change request to change the grid in which the charging portals are designed. To deal with this change, we will first have to assess its impact on our project. We can see if implementing the change is positively affecting the stakeholders after trade offs or negatively. We can forecast its effects on our Business Interests, we can also see if the change fits in the current on going project. On all the above bases we can award points to the change and on this bases either Approve it or Reject it.

“One must always be prepared for a change, be it positive or negative :D”

CONCLUSION

CONCLUSION & LEARNINGS

- We as a team found the project approach to be very successful at engaging the consumers and other key stakeholders
- While working on this project, we found this topic to be very useful in the real world
- Though the project is not as lucrative as the other projects out in market, this project is foundation and gateway of entering the near future
- We learnt how every Baseline is interconnected, also learnt how to assess risks, change and other underlying factors in Project Management
- Finally, this projects gives a basic overview of how we have created our findings

REFERENCES

- Electric Vehicle Charging Station Implementation Plans for The Upstate New York 1-90 Corridor

- Charging The Future

THANK YOU