

T-D Interconnections: Best Value Planning White Paper

Updated December 2013

1. Purpose

This paper defines the process and criteria that together constitute joint best value planning (BVP) between ATC and its customers. BVP completed as a joint effort between ATC and its customers is essential to ensuring the most appropriate solution selection and implementation for ATC's customers, the electric grid and other impacted stakeholders.

2. Background

According to Attachment FF-ATCLLC of the Open Access Transmission, Energy and Operating Reserve Markets Tariff (ASM) Tariff) Midcontinent ISO FERC Electric Tariff, Fifth Revised Vol. No. 1, ATC has an obligation to a party that requests a distribution interconnect to engage in BVP. This document discusses roles and responsibilities among ATC and its customers in satisfying this obligation

3. Reference

ATC Load Interconnection Guide seen at www.atcllc.com/oasis

4. Definitions

Best Value Planning (BVP): Through the use of this coordinated joint planning process, the intent is to select an electrical solution (best value solution) that meets performance criteria, while minimizing overall rate impact to end-use customers, in a manner that addresses the concerns of the impacted stakeholders.

T-D Interconnections: Transmission to distribution connections on the transmission grid.

Local Distribution Company (LDC): An entity receiving transmission service from the ATC transmission system at a nominal voltage level ≥ 50 kV.

Regional Reliability Organization (RRO): The regional council that governs transmission system reliability planning and operating criteria.

Electric Reliability Organization (ERO): The successor to NERC that delegates compliance reliability efforts to the RROs.

End-use customer: The retail or wholesale customer served by the LDC.

Initiator: The LDC that begins the planning process in order to meet its system needs. For network projects this will be ATC.

Load Interconnection Request Form (LIRF): Form available on the ATC Oasis to be completed by the LDC when a new or changed interconnection is expected.

Load Interconnection Queue: Located on the ATC Oasis as a reference for all LIRFs submitted and deemed complete, listing pertinent project information.

5. Process

The BVP process was updated through a continuous improvement effort in May of 2010. The new process and steps included in the process can be seen in Appendix A: Best Value Planning Process Map (which was further updated in December 2013). This process will be used as a basis for Economic or Unforecasted load

projects; however, planning studies for these types of projects will be initiated in an expedited manner through the Customer Relations and Interconnection Services departments at ATC using the Economic Development Process. Modifications may be made to the process to accommodate the need of the request.

5.1. Applicability

The BVP process shall be initiated for all project types discussed below. However the level of assessment will differ based on project type (as described below in Section 5.2 and Appendix C). Types of LDC load interconnection projects requiring BVP include:

1. A new LDC substation interconnecting to the ATC transmission system
2. Upgrading of an LDC substation transformer interconnected to the ATC transmission system
3. LDC substation expansion (for example: additional feeders, a new control house or anything that may change the common facilities agreement)
4. LDC substation rebuild
5. Change in LDC substation transformer protection
6. Addition or removal of capacitor banks
7. Addition or removal or distribution connected generators (greater than 1 MW)
8. Addition of unforecasted load (this type of project will use the Economic Development process)
9. Interconnection of a new or modified distribution connected generator (DCG)

5.2. Initiation and Evaluation

The BVP Process will be initiated with the submittal of a LIRF, notifying ATC of a future LDC – initiated project that may affect ATC facilities. If there is question as to whether a LIRF is needed, ATC Planning or Interconnection Services should be contacted. Once a LIRF is submitted ATC will evaluate completeness of the form. If complete, ATC will route internally to start the identification of the impact on the ATC transmission system, determining the type of BVP necessary for the proposed project (see Section 6 and Appendix C). Process steps to be completed after a completeness determination is made can be seen in Appendix A.

While the BVP process does not formally start until a LIRF is submitted and complete, the LDC's are encouraged to engage in planner-to-planner discussions and project-specific conceptual planning meetings as early as practical to assist in the development of alternative solutions for any electrical system project that may have significant impact on other electrical utilities in the study area. Early discussion is especially important where LDC-initiated projects may require a significant lead time to put into service. Joint planning discussions are facilitated by several vehicles of communication between ATC and its customers (see 5.3 below).

ATC maintains the load interconnection queue as a reference to facilitate mutual understanding between ATC's capabilities and its customer needs. Since it is advantageous to manage all stakeholders' expectations clearly and consistently as early as possible in the planning effort, ATC can include projects (even pre-LIRF) in the queue as early as desired; however, only projects with a complete LIRF will be published to the public queue and are those projects that ATC will take action on.

5.3. Communication

Cooperative BVP requires frequent and open communication between ATC and the LDC from the earliest stages of project conception to formalization of the selected best value solution via a project commitment agreement (PCA). Such joint planning will be most effective by making the best use of the following communication mechanisms and tools:

1. Meetings as listed in the BVP Process Map in Appendix A (Scoping discussions, Team meetings during transmission analysis, etc.)
2. Personal ATC planner to LDC planner discussions
3. Quarterly planning meetings between ATC and each of its shareholder customers
4. Planning dialogue meetings among ATC and its shareholder customers
5. ATC's 10-year assessment, published semi-annually
6. ATC's load interconnection queue posted to ATC's OASIS (<http://www.atcllc.com/O.shtml>)

5.4. Completion

The culmination of a joint BVP will typically be a BVP scoping report – depending on the BVP assessment type (see Section 6 and Appendix C). This report will provide details of the distribution and transmission analysis performed and the distribution and transmission alternatives that were studied. The report will be reviewed and signed by both parties and is essential for preparing any necessary internal approvals and/or regulatory submittals. It will form the basis for continued detailed scope development and ultimately the Project Commitment Agreement (PCA) between the LDC and ATC in order to implement the project. The report will ultimately represent an agreed upon best value solution with sufficient details necessary to enable the affected party to make appropriate budget provisions in order to ultimately meet the initiator's projected in-service date. Information provided in the LDC distribution report will be incorporated into the BVP scoping report. A guide for information that should be included in the LDC report can be seen in Appendix B.

6. Best Value Planning Assessment Type and Criteria

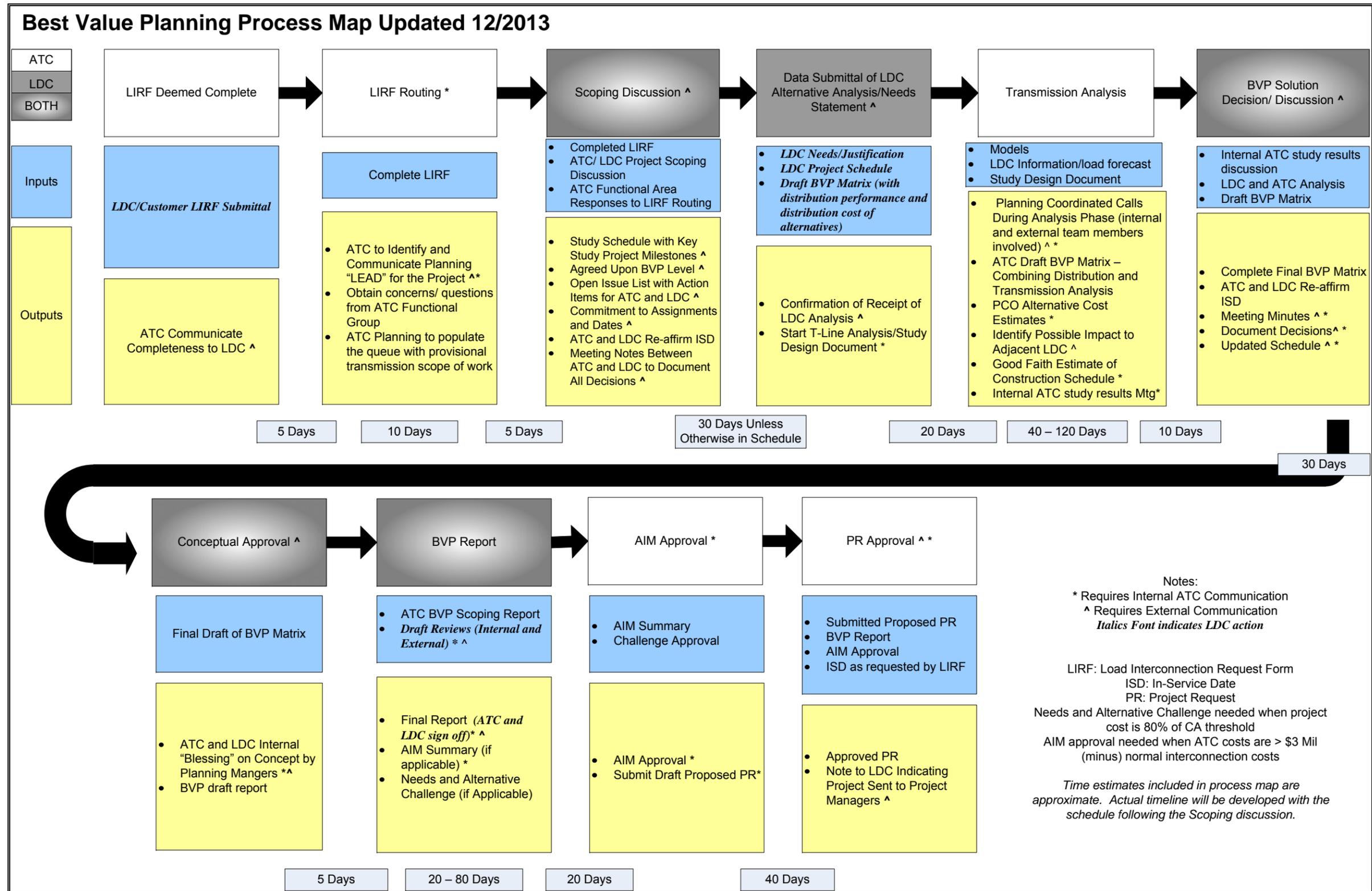
The BVP assessment type will vary for each proposed project depending on the needs identified and the possible solutions identified to address those needs. The Best Value Planning Assessment Type Table in Appendix C is meant to be used as a guide as to the extent of analysis and documentation which is needed within each BVP assessment type.

Transmission system performance criteria are governed by the Midwest Reliability Organization, ReliabilityFirst Corporation and NERC. Although some of these requirements are voluntary at this time, many others have become mandatory requirements due to their approval by the FERC under the Energy Policy Act of 2005. Thus, transmission system performance criteria cannot be changed; therefore making it a high priority for any joint BVP assessment.

Distribution system planning and performance criteria are governed by applicable state statutes and are typically restricted to point of use voltage requirements. Reliability indices are often used for distribution utility corporate targets and are an acceptable system performance metrics to use in BVP. If additional LDC planning

and/or operational criteria are used in LDC decision making, it should also be included in BVP.

Appendix A Best Value Planning Process Map



Appendix B

LDC BVP Report Guide (to be incorporated into the ATC BVP scoping report)

Introduction and Background

Describe the distribution electrical system and how the system serves the study area. Other general comments can be added in this section, such as relevant historical information, load growth rates and recent developments, nature of the area electrical load demands, etc. Maps of the distribution system and tables/graphs for load growth and reliability are desired to tell the background of the area.

Project Need

- System normal (in-tact) conditions—
 - Describe Planning Criteria violations (voltage, capacity and/or reliability) throughout the planning horizon
 - Discussion on load growth, type of customers and economic impacts
 - A table or a diagram can be included showing the in-tact system with voltages and element loadings
- System Contingency Conditions
 - Describe planning criteria violations (voltage, capacity and/or reliability) throughout the planning horizon and the cause of the system problems:
 - Contingency type (lines, transformers, etc.)
 - Area with load at risk under contingency
- System Concerns—other reliability issues such as:
 - Extraordinary needs. For example, “Area loads require more secure power supplies due to severe cost impacts for long term outages.” OR “Area residents face extreme conditions when this outage occurs, because there are no bridging capabilities on the distribution system.”
 - Relevant outage statistics on poor performing lines or substations
 - Electrical system maintenance needs
 - Other reliability issues.

Project Alternatives

A project alternative is defined as a solution that will solve all area concerns in the area (ranking at a minimum of Poor in the BVP Matrix as seen below). Any distribution alternatives that were analyzed but didn't solve the area concerns should be included as a “dismissed option”. The project alternative section should include the following:

- Description of each alternative considered
- Performance discussion and/or tabular evaluation of each alternative
- Cost estimates for each alternative distribution costs (ATC will provide the transmission costs)
- Economic evaluation of each alternative on a time comparative basis
- Discussion on options that have been dismissed

It is recommended that one distribution only alternative is included with a transmission/distribution alternative – even if the distribution only alternative is not likely to be constructed. This is important for comparison purposes to show the need of transmission additions/upgrades. A distribution alternative could also include distribution upgrades to defer a new substation. In this case the alternative will include the costs of the distribution upgrades and the cost of the new substation.

BVP Matrix

A BVP matrix including all alternatives including the distribution performance of each alternative should be included for each proposed project with BVP level greater than 1. The LDC is responsible for completing the Distribution System Performance and Financial Performance (for any distribution costs or credits) sections.

The Planning Problem/Descriptions listed in the first column are just suggestions; change according to specific problems within the study area. For example if there is a substation transformer loading problem, the Planning Problem/Description would be listed as Substation X transformer overloaded during loss of Substation Y. Likewise a voltage example would be Feeder 2 is below 114 V during the loss of Substation Y.

ATC will complete the Transmission System Performance section and related transmission system costs.

Planning Problem/Description	Alternative 1 (name)	Alternative 2 (name)	Alternative 3 (name)	Comments
Distribution System Performance				
Normal Capacity				
Normal Voltage Support				
Contingency Capacity				
Contingency Voltage Support				
Contingency Loss of a Substation/transformer				
Contingency Loss of a Distribution Feeder				
Outage Frequency/Exposure				
Fault Current Impacts on Distribution Facilities due to Transmission System Changes/outages				
Motor Starting Capabilities				
Overcurrent Protection/Coordination Capabilities				
Real Estate Risk (Substation or Feeder ROW)				
Constructability				

Distribution Underbuild Impact				
<i>(Any other project specific concerns)</i>				
<i>(Any other project specific concerns)</i>				
<i>(Any other project specific concerns)</i>				
<i>(Any other project specific concerns)</i>				
Transmission System Performance				
Normal Voltage				
Normal Loading				
Contingency Voltage				
Contingency Loading				
Real Estate Risks				
Constructability				
New Transmission Line (miles)				
Environmental Impacts				
Aesthetic Impacts				
Flexibility for Additional Load Growth				
Regulatory Impacts				
Financial Performance (In 20__ dollars)				
Total Loss Savings				
ATC Capital Cost				
Distribution Capital Cost				
Total Capital Cost				
<p>Key to Ratings</p> <p>+++ Excellent ++ Good + Acceptable</p> <p>- Marginal --Poor --- Unacceptable</p> <p>N/A Not Applicable to the Alternative</p>				

Approximate Location of new substation

Please provide information of the following concerning a new (or Greenfield) substation site:

- If more than one substation location was considered, discuss what is the preferred site, why and why were others not preferred

- Process in which the land will be acquired (for example, it is acquired, it has an offer to purchase, needs permits, haven't started acquiring yet, etc)
- How much land you intend or have purchased
- A map of the area

Conclusion / Recommendation

Conclusion and recommendation should be stated here. A final summary of the reasons for choosing the preferred alternative can also be given here.

Appendix C

Best Value Planning Level Table

BVP Assessment Type	Explanation**	LDC Information (minimum)	Transmission Analysis	ATC Documentation
NCW/MCW	No or Minimal ATC Capital Work (< \$100,000) and no transmission analysis	Completed LIRF	No planning analysis – internal ATC routing only	Letter stating assessment completed
Alternative Assessment	May include a transmission alternative interconnecting load to the transmission line currently serving the local load or assessment of multiple substation configurations	Completed LIRF and LDC distribution assessment (as listed in guidelines in Appendix B)	Potential for planning analysis of alternatives including a difference analysis (compared to the base case model) including Category B and C contingencies and possibly different transmission system network and load configurations – amount determined by engineering judgment and team meetings	BVP Scoping Report – describing the pertinent assumptions and assessment that was performed
System Study	ATC AIM Governance approval needed (\$3 million minus substation costs or an abnormal T-D interconnection configuration) or ATC Needs and Alternatives challenge is needed (ATC project cost of 80% of the CA threshold) or multiple transmission alternatives	Completed LIRF and LDC distribution assessment (as listed in guidelines in Appendix B) with at least one viable distribution alternative (see Project Alternatives in Appendix B)	Modeling analysis for at least two alternatives including a difference analysis (compared to the base case model) including Category B and C contingencies with different transmission system network and load configurations. Modeling will encompass at least a 10 year planning horizon	BVP Scoping Report
System Study	ATC needs to file a Certificate of Authority (CA) or Certificate of Public Convenience and Necessity (CPCN) with the PSCW	Completed LIRF and LDC distribution assessment (as listed in guidelines in Appendix B) with at least one viable distribution alternative (see Project Alternatives in Appendix B)	Modeling analysis for at least two alternatives including a difference analysis (compared to the base case model) including Category B and C contingencies with different transmission system network and load configurations. Modeling will encompass at least a 10 year planning horizon	BVP Scoping Report and support for CPCN or CA filing documentation

*BVP assessment type and high level schedule will be developed after Scoping Discussion with Customer as seen in Appendix A

**These are typical explanations of BVP Assessment types however any given project may change during BVP if the scope of work changes