VALUE ENGINEERING FACILITATION KIT

CAWANGAN PERANCANGAN ASET BERSEPADU • **JKR**

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Published by:

First Edition December 2015
Printed by Marzuq Print & Trading
ISBN 978-967-5957-58-1

DOCUMENT CONTROL

Document Information

Document Title	Value Engineering Facilitation Kit
Authorising Authority	Senior Director Cawangan Perancangan Aset Bersepadu JKR Malaysia

Version Control

Version No	Date	Nature of Change
Version 1.0	December 2015	First Issue

Contact Details

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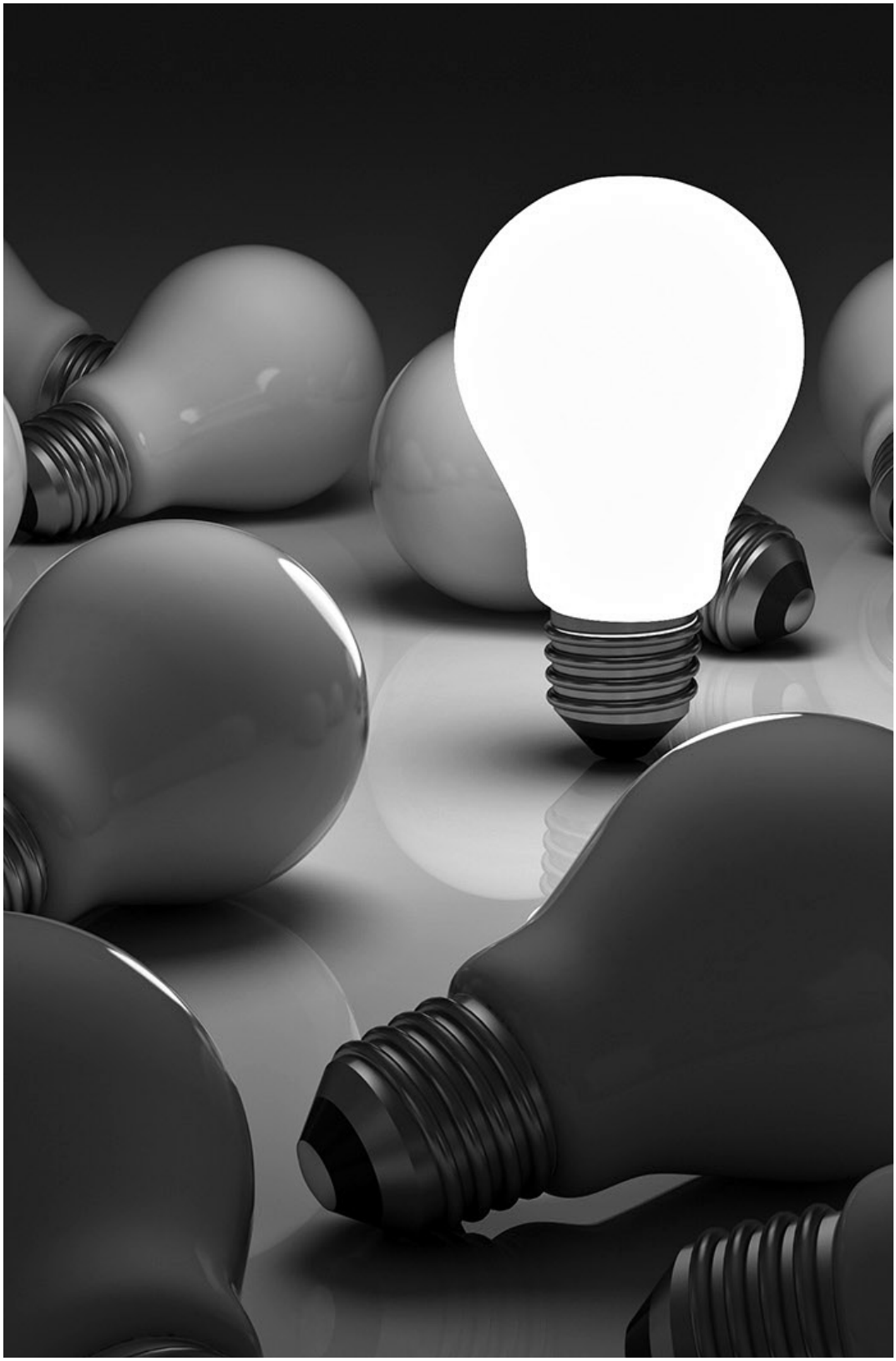

PREFACE

This book is about facilitation, working with groups and developing skills in facilitation of Value Management (VM) studies. It is one of Jabatan Kerja Raya Malaysia's (JKR) initiative to provide quality information and practical assistance to facilitators conducting VM studies for public projects. This publication complements The Value Engineering Application Guidelines for Public Projects published by JKR in December 2012.

The book outlines the concept of facilitation, methodology for facilitating VM study and application of tools and techniques commonly used in facilitation of VM studies. There are three chapters in this book; each chapter focuses on specific aspects of facilitation:

Chapter 1 briefly explains the principles and values of general facilitation and provides detailed descriptions on VM facilitation; covering areas of VM study styles, facilitation approaches and skills, as well as helpful tips on how to avoid common pitfalls in VM facilitation

Chapter 2 explains the activities and tasks to be carried out at the various stages and phases of a Value Engineering (VE) study; Pre Lab Stage, Lab Stage (Information, Function Analysis, Creative, Evaluation, Development and Presentation phase) and Post Lab Stage. It provides guidance on the purpose, duration, the materials and tools required for each activity, including practical and effective tips to improve them.

Chapter 3 describes the selected tools and techniques commonly used in VM Study facilitation. It describes the purpose and provides guidance on how to use them, citing examples of application where possible. They are adapted from international VM best practices and contextualized to VE studies for public projects in Malaysia. They are not exhaustive and not limited to the ones listed in this book.

This book aims to provide a comprehensive publication that captures good practice and practical tips from experienced practitioners as a catalyst to develop good facilitations skills, instils standardisation and consistency in VM practice in our effort to improve the effectiveness of VM studies.

ACKNOWLEDGEMENT

Our heartfelt gratitude to those who have contributed knowledge, ideas, effort and time to develop this document:

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Muhammad Fahmi bin Shaari
Syamsul Kamal bin Ismail
Rezal bin Rohan
Salawati binti Zainuddin
Syafawati binti Asmawi
Hanida binti Sabaran
Rosyatimah Binti Shah
Saidatul Hani Binti Surohedin

Others:
Abdul Rahman bin Ambari
Ir. Mohamad Darus bin Selamat
Ir. Dr. Hannerita binti Mohamad Zainal
Noraniza binti Mohamad Yusof
Nazariah binti Suadi
Zuraida binti Sedik

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ACRONYMS & ABBREVIATIONS

A.C.I.D	Authorize-Consult-Inform-Do
BQ	Bill of Quantities
CAPEX	Capital Expenditure
CFTE	Client Acceptability, Functional Suitability, Technical Feasibility, Economical Feasibility
CVS	Client Value System
EDI	Evaluate, Discard, Information
EIA	Environmental Impact Assessment
EPU	Economic Planning Unit
FAST	Function Analysis System Technique
GFA	Gross Floor Area
HODT	Head of Design Team
HOPT	Head of Project Team
JKR	Jabatan Kerja Raya
OPEX	Operational Expenditure
PDA	Preliminary Detailed Abstract
PM	Project Manager
POE	Post Occupational Evaluation
SI	Soil Investigation
SOA	Schedule of Accommodation
SPN	Seksyen Pengurusan Nilai
SS	Study Style
VA	Value Assessment
VE	Value Engineering
VM	Value Management

LIST OF FIGURES & TABLES

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GENERAL & VALUE MANAGEMENT FACILITATION

WHAT IS FACILITATION

Facilitation is about working with people and assisting individuals with their interactions and discussion using certain skills in a process, which allows them to complete agreed tasks or activities effectively. Ultimately, facilitation will foster the followings:

Democracy
Each person has an opportunity to participate in the group.

Responsibility
Each person is responsible for their behaviour and for the performance of the group.

Cooperation
Group members work together to achieve their collective goals

Honesty
Each person must represent him or herself honestly

Equality
Each person has something to contribute to the group, and is provided a fair opportunity to do so

FACILITATION PRINCIPLES AND VALUES

It is important for you as the facilitator to understand and apply the principles and values of facilitation as it provides strong fundamentals in conducting facilitation activities. The principles of facilitation help to realize our goals and objectives, ensuring a productive outcome.

Listed are main **facilitation principles** (Markwhardwick, 2010) that can guide you through complex and tricky situations:

Be neutral and unbiased

Focus on group process and maintenance, not always just content

Be pragmatic and results focused

Plan and engage participants to accomplish targeted goals and desired outcomes.

Plan before doing, but be flexible in execution

Design the session and prepare for potential obstacles before the event. If it happens during the event, be quick on your feet to recognize audience needs. Don't try to control everything and everyone.

Use proper models, methods, and tools & techniques

Select the appropriate methods & techniques for the group and situation. Don't use gimmicks to persuade or give canned answers.

Understand group dynamics and individuals strengths

Understand the dynamics driving individuals and groups on multiple levels.

Encourage participation

Engage participants by using a variety of interactive and participative tools and methods.

Collaboration in decision-making

Build participant support by using dialogue, effective discussion, and testing for understanding and agreement.

Manage the learning environment and climate

The facilitator has the opportunity to create a permissive environment for positive interaction while using structures and group dynamics and communication tools to create success.

Manage conflict and resistance

Understand and address resistance in appropriate ways. Conflict is important for the team to grow; it cannot be ignored because it undermines trust and openness.

Seek and use feedback before, during and after the facilitation

Feedback is crucial for content, process and outcome effectiveness.

Monitor and manage yourself

Practice self-awareness and control of your strengths, preferred presentation, style and model appropriate behavior.

Facilitation Values

Values are important beliefs or ideals about what is good or bad and desirable or undesirable in doing things. It has a major influence on a person's behavior and attitude and do provide guidance in all situations.

In facilitation, it is important for you to demonstrate:

Responsibility

You are responsible for the plan you make and how it affects the structure, process and participation at the study sessions. You must be sensitive to how much responsibility members are prepared or able to take.

Listening

You must have the ability to listen to what people are saying and tuning to what they are not saying. You must be aware of the verbal and non-verbal means of communication.

Cooperation and participation

You and your team work together in achieving mutual goals/objectives. Everyone in group must be encouraged to share ideas, concerns and suggestions and contribute to solutions / initiatives.

Respect

You must respect and acknowledge each individual in the group. They are given the opportunity to speak freely and their individual boundaries are honoured.

Equality

Each member is regarded as having the equal right to contribute to the group and is provided a fair opportunity to do so.

Neutrality

You should facilitate neutrally and guide the team members to think creatively about issues where there are differences in opinion and agenda. You must be able to assist team members to listen and understand one another and find cohesion from all points of view, thus developing a sense of trust and fairness within the group.

Trust and honesty

You must honestly reflect your values, concerns and priorities in working with the group. You have to set the expectation of honesty from each member and encourage the development of trust within the group.

VALUE MANAGEMENT FACILITATION

Value Management (VM) facilitation is a tool that synthesizes the value management discipline into a viable process, which serves as the basis for a successful value improving mission.

Acquiring the knowledge of VM process/methodology and its variety of tools and techniques is paramount for VM facilitators. Effective delivery of the process is equally important to ensure successful VM study.

Characteristic of VM Facilitation

- Specified VM process/methodology applied during VM lab.
- VM lab team members are guided on VM principles and values, and application of appropriate tools & techniques.
- Despite its structured nature, VM facilitation process offers flexibility for adaptation to time constraints.
- Direct involvement of stakeholders or customers throughout VM studies.
- Success measurement of VM study based on established clear set of goals.
- Extensive pre-study carried out prior to lab commencement.

Critical Success Factors Of VM Facilitation

- Clear objectives and focus on outcomes.
- Active participation and support of client, including end users throughout study.
- Trust and good team dynamic.
- Competent facilitator.
- Structured process with effective tools and techniques.
- Optimum utilization of resources.
- Multidisciplinary oriented.
- Decision based on consensus.

Responsibilities of VM Facilitator

A facilitator is responsible for conducting the VM study according to the complete process covering all study stages and responsibilities, as follows:

- Comprehend the study context, objectives and expected outputs
- Advise on forming effective lab team composition
- Gather, analyse and synthesize information of study scope
- Communicate information to lab team
- Manage and facilitate lab through structured process
- Encourage human dynamic during lab process

All VM Study labs will be led by a Lead Facilitator, who acts as the Value Manager for the study. The Lead Facilitator has added responsibilities as follows:

- Structure, plan and manage the study process
- Lead and manage facilitation team
- Ensure each lab group is on track
- Prepare report and present study findings
- Drive creativity and innovation in the study process
- Motivate lab team to achieve study objectives.

In VM facilitation there are three (3) possible facilitation arrangements as below:

- **Internal facilitator (internal to the project team)**
  This is when a project team member acts as the facilitator for the VM study. This is not ideal as the facilitator will face difficulty to remain neutral throughout the study.

- **External facilitator (external to the project team but internal to the organisation)**
  The appointed facilitator comes from the same organization and has no direct working relationship with the project team. In this situation the facilitator has no conflict of interest to the project and can remain independent throughout the study.

- **External facilitator (external to the project team and organization)**
  This is ideal as the facilitator is external to both, the project team and organization and will be highly focused on achieving maximum outcome for the project.

VM Study Styles

In value study facilitation, you need to be aware of the different study styles which may be adopted, depending on the degree of professional judgement required for the study. The Study Style must be strategized from the outset appropriately as an intervention in a project or programme. There are four (4) Study Styles representing different levels of study as follows (adapted from Male, Kelly, Gronqvist and Graham, 2007).

Study Style 1 (SS1) takes place when an independent and multi-disciplinary facilitation team assists the internal project team to integrate and prioritise information, understand value problems, structure the thinking and develop recommendations through VM methodology. In this situation, your role is as a process manager ensuring the use of appropriate VM tools and techniques. If you are a beginner or less experienced, you may find comfortable to practice SS1.

Study Style 2 (SS2) is similar to SS1 however, the focus of the study is to challenge and introduce change to the project being studied. Here, your professional background, level of expertise and related experience will be an advantage to you in challenging ideas, perceptions and assumptions to seek best possible solutions.

Study Style 3 (SS3) occurs where an independent facilitation team is appointed to bring together a team of external specialist to conduct value audit study. The audit team must be multi-disciplinary, works independently and make appropriate recommendations.

Study Style 4 (SS4) is similar to SS3. However, the facilitation team together with the specialist, will conduct a value audit study as well as perform subsequent reconfigurations. In this case, the facilitation team can be held accountable for the study outcomes and hence professionally liable.

Figure 1.1 below demonstrates the continuum of the above Study Styles; as the level of professional judgement of the facilitation team increases. Along the continuum, there is a shift from value recommendations made by the existing team with the assistance of the value manager / facilitation team (SS1-SS3), to one where the value manager is liable for the advice / recommendations provided by a tailored team of specialists (SS4).

Study Style 1 (SS1)	Study Style 2 (SS2)	Study Style 3 (SS3)	Study Style 4 (SS4)
Where a value manager / facilitation team works with an existing team to assist them to understand value problems, structure the thinking and develop a way forward	Where a value manager / facilitation team works with an existing team and the objective is to challenge and introduce change	Where a value manager / facilitation team brings together an independent tailored team of specialists for a value audit study	Where a value manager / facilitation team brings together an independent tailored team of specialist for a value audit and implements reconfiguration

Figure 1.1: Value Study Styles Continuum (adapted from Male, Kelly, Gronqvist and Graham, 2007).

Working with Groups

In working with group, you should always be concerned and focus on ensuring group effectiveness keeping the balance of meeting individual, group and task needs through:

Working atmosphere

All activities take place in a supportive atmosphere where suggestions, ideas, information and criticisms are offered and received in a helpful and respectful way.

Communication

High motivation to give and receive information which is relevant, and of value to the group.

Conflict management

Comfortable with disagreement and committed to seeking resolutions through open negotiation.

Leadership

Power struggles are resolved on the basis of how best to achieve the task rather than who should control the group.

Goals

Establish clear goals that members can commit to achieve.

Decision making

Decision making procedures are established.

Commitment

Highly committed to the task and to each other.

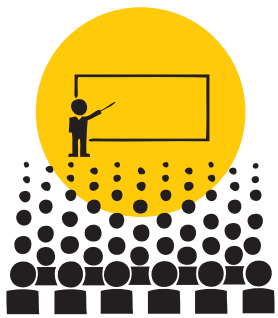
Roles

Individuals understand their roles and responsibility within their group.

Figure 1.2: Working with group (Adopted from Keating,Colma D.M,2003)

VM Facilitation Approaches

In facilitating VM studies, you may adopt similar approach to leadership practice (cited by Male, 2004). The following leadership approaches (Figure 1.3) are adaptive to VM facilitators in performing their roles. As a facilitator, you should be able to apply all four approaches in any situation and not allow one approach to dominate others.



Seek Consensus:
- Avoid conflict at all costs
- Always seek common groundand minimise differences

Laissez-faire:
- Let the team go its own way
- Social interaction is more important

Autocratic:
- Steer and lead the team
- Constantly intervenes
- Dominate team dynamics

Guiding:
- Appropriate style to suit the situation
- Manage team dynamics
- Manage the process

Figure 1.3 Four Quadrants of Facilitation Approach (as cited in Kelly, J., Male, S and Graham, D., 2004)

VM Facilitation Skills

While working with groups during VM Lab Stage, you need to use a wide range of skills appropriate to task, group or individual needs. Based on the Figure 1.4 below, you may use one style or a combination of the styles in facilitating the task or process during VE Lab effectively (Adapted from source: Prendiville, 2004):

Directive: Giving people information, instructing them how to do something;	Example question; *"This is how to describe a function"*
Interpretive: Suggesting other words or helping someone to find the words to express what he/she means;	Example question; *"Do you mean the 'verb-noun' for the function is 'transmit-load'?"*
Exploratory: Asking questions, encouraging people to share their experience and ideas;	Example question; *"What options do you have to perform the same functions?"*
Cathartic: Encouraging and modelling the expressions of feelings and emotions as they emerge by asking a question:	Example question; *"Should we be concerned achieving users' satisfaction?"*
Delegating: Assigning tasks, roles or functions to individuals.	Example situation; *in reviewing project cost, the task can be delegated to QS or team members.*
Evaluative: Assessing what someone says, providing a statement of value in relation to behaviour;	Example statement; *"That seems a good alternative to the existing proposal"*
Participative: Taking part in discussion, sharing personal experiences and encouraging others to do likewise;	Example statement; *"In my previous VE Study for a similar project, I discovered…"*
Sharing: Encouraging the sharing of past and present feelings and those about future events, with a question;-	Example question; *"Does anyone have experienced a similar problem in your project?"*

Figure 1.4 Styles in Facilitating Value Study Group (Adapted from source: Prendiville, 2008)

REMEMBER!

- Be neutral all the time.
- Be aware of tendency to move away from being a process manager to a problem solver.

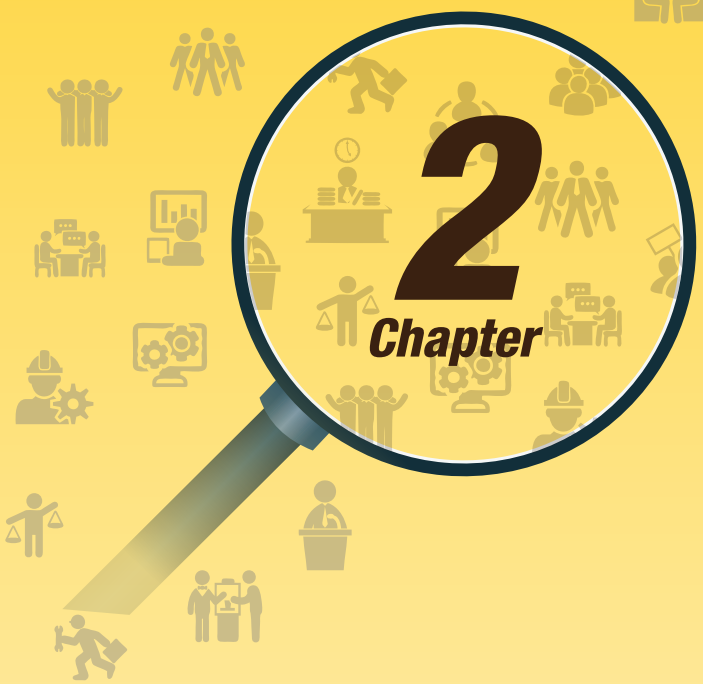
Common Pitfalls in VM Facilitation

Highlighted below are common pitfalls and effective responses in dealing with difficult situations when working with groups.

Common Pitfall	Typical Mistake	Effective Response / Avoidance
Failure to start and end on time	• Tolerate tardiness • Wait for "key personnel" to arrive • Go over time allocated without asking for consent from members • Unrealistic programme using common agenda	• Start and end according to agreed agenda • Ensure attendance of key members prior to lab • If you need to go beyond time allocated, get consent and review agenda • Customize agenda based on study needs and do not be too optimistic
Lack of focus on study objectives and / or expected outputs	• Lack of understanding of client's real expectations • Study structure is not steered towards achieving VM Study objectives	• Discuss and obtain agreement from client on their expectations • Customize study objectives and monitor achievement during study process
Failure to identify key issues prior to Lab Stage	• Lack of sufficient time for thorough study during Pre Lab Stage • Lack of thorough study and exploration of issues	• Allocate time for thorough study and facts finding • Do thorough study to discover problems or issues
Low participation by group members	• Lack of facilitation skills to encourage members to participate • Allowing "passengers" (non-participating members) during discussion	• Stimulate members' participation using effective skills such as questioning skills, VE tools and techniques • Assign tasks in smaller groups (where appropriate / needed)
Becoming problem solver or participating in the tasks	• Giving solution or ideas to expedite process	• Be patient and continue encouraging members to find and suggest solutions
Influencing group's ideas or decision	• Bias in responding to ideas or decision • Provide judgement on ideas or solutions	• Always remind yourself to be neutral and not bias to personal preferences or opinions • Refrain from giving judgement on ideas or solution generated
Poor follow-through on assigned tasks	• Allow "Laissez-faire" behaviour	• Active engagement with team members on assigned task during working group session
Domination by vocal members	• Allowing one or a few members to dominate discussion	• Encourage silence members to contribute ideas
Conflicting group members	• Allow conflicting members to argue with no intention to reach agreement	• Allow members to disagree • Allow short break to dissipate of the conflict • Reach out to other members for opinions to resolve conflict or move on to other matters
Allow discussion to go off track	• Let the discussion get unfocused	• Remind team member the topic of discussion
Worn out team dynamic	• Force team members to work on assigned task when exhausted	• Allow short break to refresh • Allow flexibility on schedule while maintaining timeline

Table 1.1: Common Pitfalls in VE Study Facilitation

Always remember that the session you are facilitating belongs to your participants.
You are not there to fix problems; you are there to guide the group to reach its own conclusions!



FACILITATING VALUE ENGINEERING STUDY

PRE LAB STAGE

PURPOSE

- Check project readiness for VE Study
- Gather and synthesize project information
- Plan and prepare for VE Lab activities

TIME FRAME

- 2 to 3 weeks (Subject to project readiness and sufficiency of information for conducting VE Lab)

MATERIALS AND TOOLS

Materials

- Signed-off VA Lab Report (where applicable)
- Client needs and requirements
- Approved Project Brief including Schedule of Accomodation (SOA) and Gross Floor Area (GFA) for building project
- Drawings (latest reviewed drawings)
- Specifications
- Technical brief
- Technical report (traffic study, soil investigation, survey plan, feasibility study, EIA etc.)
- Relevant statistical data
- Approved project budget
- Project Cost Estimate-Preliminary Detailed Abstract (PDA) (latest reviewed cost)
- Project Work Programme
- Project Risk Management Plan (if any)
- Relevant authorities requirement
- Minutes of Meeting
- Post Occupational Evaluation (POE) of similar facility (if any)
- Relevant correspondences on project implementation

Tools and Techniques:

- VE Study Pre Requisite Form
- VE Study Pre Lab Checklist Form
- VE lab Participant Identification (A.C.I.D.Test) Form
- Paired Comparison
- Client Value System (CVS)
- Function Analysis System Technique (F.A.S.T)
- Presentation slides
- Site Visit
- Similar Facility Walk Through
- Cost Worth Index
- Others as required

The quality of VE study relies much on the quality of information gathered and prepared during pre study

The more time you spend for Pre Study the better VE Study will be

Prior to VE lab, it is important for facilitators to identify, obtain and do desk study on relevant documents. Right tools and templates should be selected and prepared accordingly

A

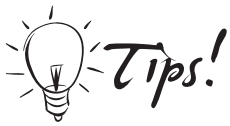
Pre Lab Stage Activities	Tasks	Time Allowed
A **Interface with Client and Project Manager (PM) / Head of Project Team (HOPT) (JKR)**	i. Upon receiving request for VE Study, you need to follow up with the Client / PM / HOPT (JKR) to arrange for an Initiation Meeting or discussion	Immediate
	ii. During the Initiation Meeting / discussion, you need to discuss and determine the followings: - Project information - Status of project implementation, to check for readiness and VE Study timeline - VE Study objectives and expected VE Study outputs / findings / deliverables - Issues, implication and constraints of VE Study - Compliance and deviations (if any) of VA Study - VE study context - Requirement for further VE Study (if necessary) - Logistics - date, itinerary, venue, budget - Composition of lab participants - List of requirements for Pre Lab and VE Lab	Half day
	iii. You are required to advise the Client PM /HOPT (JKR) on any value issues to be resolved prior to lab such as deviations (scope and cost) against VA / EPU approval. In the event of such deviations, direction or decision from EPU is required.	

Where required, depending on urgency of VE Lab, the Initiation Meeting may be combined with Pre Lab Meeting

Pre Lab forms can be provided to Client / PM / HOPT (JKR) prior to initiation meeting for early preparation

A

Pre Lab Stage Activities	Tasks	Time Allowed
B **Collate project information**	i. You will follow up with Client / PM / HOPT (JKR) / designers / HODT (JKR) to provide information and documents as follows (use VE Study Pre Lab Checklist Form): - Signed-off VA Lab Report (where applicable) - Client needs and requirements - Approved Project Brief including SOA and GFA for building project - Drawings (latest reviewed drawings) - Specifications - Technical brief - Technical report (traffic study, soil investigation, survey plan, feasibilility study, EIA etc.) - Relevant statistical data - Approved project budget - Project Cost Estimate / PDA (latest reviewed cost) - Project Work Programme - Project Risk Management Plan (if any) - Relevant authorities requirement - POE of similar facility (if any) - Relevant correspondences on project implementation - Others as required ii. You need to collect and compile information and documents (as listed above) for the purpose of pre study and lab.	1 - 2 weeks



Ensure the latest information and documents are provided and submitted

A

Pre Lab Stage Activities	Tasks	Time Allowed
C **Commence initial study**	i. You shall commence initial study covering the followings: - Study project objectives and project outcomes. - Study project functions and propose FAST Diagram. - Identify and prioritize CVS with client. - Study design proposal and quality requirements. - Identify Space / Cost / Quality (or others) study model(s). - Check compliance or deviations (if any) of design proposal against VA recommendation / relevant Government approval. - Any other initial study requirements.	3 - 5 days of desk study (by Lead Facilitator); and 1 - 2 days (by Facilitation Team)
	ii. You need to conduct Pre Lab Meeting or further discussion; to understand the project design and/or to resolve specific value issues (e.g. Scope/Cost deviation from VA) involving Client, PM / HOPT, designers / HODT (JKR), authorities and others.	Half day
	iii. Wherever necessary, visit project site together with Client, PM / HOPT, designers / HODT (JKR) and others prior to lab.	Half to 1 day for site visit
	iv. You may come across non-compliance, possible value mismatches and / or potential value improvements. Highlight and focus on them during lab.	

The initial study findings (by Lead Facilitator) will be shared with the Facilitation Team- focusing on value issues; possible value mismatches; and/or potential value improvement

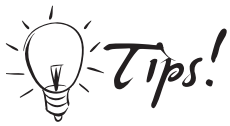
Wherever required, Pre Lab Meeting may be combined with Initiation Meeting [See Task A. ii]; and it can also be repeated for in- depth study or to resolve specific issues

Consider ample travel time to any remote site location

Understand the project design in relation to the site conditions

A

Pre Lab Stage Activities	Tasks	Time Allowed
D **Develop lab programme and arrange logistics**	i. You will prepare the followings for lab execution: - Develop lab agenda - Identify and appoint facilitation team - Identify lab tools and techniques - Identify and propose list of lab participants - Identify lab working groups and study scopes - Prepare lab kit / study materials (if necessary) - Set lab arrangement and requirement (room layout, equipment etc.) - - Make travel arrangements ii. You need to advise Client / PM / HOPT (JKR) on preparation of materials, equipments and travel arrangements.	1 - 2 days
E **Organize orientation session (if necessary)**	i. Wherever necessary, you may conduct orientation sessions for: - Facilitation team (a dedicated session) - you will share initial study findings, discuss and strategize lab execution with other facilitation team members - Project team / Lab participants (session may be conducted during Initiation Meeting / Pre Lab Meeting / Lab (Information Phase) - for briefing on VE Study implementation.	Halfday 30 minutes



Keep in close contact with client / PM / HOPT (JKR)

VE Lab must be strategized according to the pre-determined VE Study Objectives and expected study outputs / findings

LAB STAGE

PURPOSE

- Explore value mismatches and alternatives to achieve project objectives
- Generate, evaluate, develop options and collectively recommend best solutions

TIME FRAME

- 3 to 5 working days depending on project type, project complexity and lab schedule

LAB PHASES

Consist of 6 phases:

- Information Phase
- Function Analysis Phase
- Creative Phase
- Evaluation Phase
- Development Phase
- Presentation Phase

Proper design of VE Lab Agenda will ensure all lab phases are carried out accordance to the schedule and completed within time.

Facilitators shall assist lab participants including scribers in expressing / recording lab inputs / ideas during all lab stages

INFORMATION PHASE

PURPOSE

- Develop understanding of the project and share required details
- Gather,synthesize and verify project information

TIME FRAME

- 6 to 8 hours

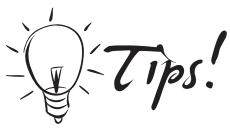
MATERIALS AND TOOLS

Materials

- Signed off VA Study Report (where applicable)
- Approved Project Brief
- Drawings (latest reviewed drawings)
- Specifications
- Technical brief (proposed design by designers)
- Technical report such as soil investigation (SI) report, traffic data analysis etc.
- Relevant statistical data
- Project cost estimate (latest reviewed cost)
- Project work programme
- Project Risk Management Plan
- Relevant authorities requirement
- Site information
- Others as required

Tools and Techniques:

- Lab Kit (Slides of VE Lab Briefing, VE Lab Agenda, VE Study Objectives, status of VA compliance etc)
- VE Study Model(s) (Cost Model / Space Model / Quality Model / Life Cycle Cost Model)
- Paired Comparison
- CVS
- Presentation Slides
- Information Phase Template
- Integrity Pact Form (*Surat Akujanji*)
- Others as required



Information phase is crucial to bring the participants' understanding to the same level and align their thinking towards VE process.

Allow sufficent time to share, elaborate and accept information

The effectiveness of information sharing during this stage relies very much on sufficiency of information / documents gathered during Pre Lab Stage

B1

Information Phase Activities	Tasks	Time Allowed
A **Register lab participants**	i. You need to ensure participants register their attendance. ii. Ensure key stakeholders attend the lab.	Upon arrival
B **Hold lab opening session**	i. You are required to conduct introduction session: - invite relevant stakeholder (e.g. EPU / Client / PM / HOPT) for opening remarks and sharing of policy direction as well as expectations from lab ii. You will conduct team building session - apply appropriate icebreaking or team building techniques to encourage teamwork iii. You may conduct briefing on VE application, procedure and process for public projects if necessary (where most participants are not familiar with VE implementation)	Half to 1 hour
C **Brief and verify VE Lab agenda**	i. You need to conduct briefing on lab agenda and process: - show slides of proposed lab agenda - explain details, time duration and expected outputs for all phases ii. Obtain and confirm VE lab agenda iii. You are required to conduct briefing on Information Phase: - explain details, time duration and expected outputs	15 minutes
D **Brief and verify VE Study objectives**	i. You need to conduct briefing on VE Study objectives ii. Obtain concensus to verify VE Study objectives	15 minutes

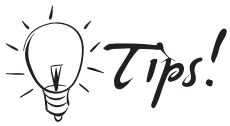
Crosscheck with invitation list & A.C.I.D

Be less formal and responsive to participants

Encourage participants to explain their roles in the project

B1

Information Phase Activities	Tasks	Time Allowed
E **Brief project information**	i. You have to allow respective participants to present project information as follows; - VA / relevant government approval - Client needs and requirement - Project objectives - Project background (scope, status, location, timeline, team, etc) - Proposed design from all disciplines - Project cost estimates - Project risks ii. You need to summarize and present status of compliance of VA / relevant government approval	2 to 3 hours
F **Verify project objectives and project outcomes**	i. Verify project objectives and project outcomes: - Get feedback from stakeholders	15 minutes
G **Confirm proposed VE Study Model(s)**	i. Present the proposed study model(s): - (Cost Model / Space Model / Quality Model / Life Cycle Cost Model) ii. Confirm the proposed study model(s) as the baseline for optimization through VE Lab.	30 to 45 minutes
H **Inform Client Value System (CVS)**	i. Present CVS findings (as prioritised by client) and ensure understanding on prioritised CVS as value criteria to be translated in design, specification and expected project deliverables	15 minutes



Tabulate status of VA compliance (e.g. on scope, cost and GFA)

To ensure clarity and alignment of project objectives

Common study model(s) adopted: Cost Model (PDA) and / or Space Model (SOA)

Ensure completeness and reliability of study model (s) during pre lab stage

B1

Information Phase Activities	Tasks	Time Allowed
I **Confirm lab working group and selected VE Study scopes**	i. Conduct briefing on proposed lab working groups and selected group study scopes ii. Allow sufficient time for participants to move and form the groups. - Allow group members to nominate a group leader and select a scriber for each group.	15 minutes
J **Establish project parameters to be studied**	i. Conduct briefing on how to record information in Information Phase template ii. Allow participants to discuss and record project parameters and any issues related to project iii. Allow plenary session for groups to present Information Phase template findings. In lieu of time, you may select to present only key information and output.	1 to 2 hours

Group leader should manage team participation including assigning tasks of presenter and scriber among team members

Monitor group discussion to focus on parameters / issues and to avoid advancing to potential solutions at this stage

FUNCTION ANALYSIS PHASE

PURPOSE

- Understand the functions of the project / spaces / elements / components / systems
- Identify mismatches and potential value improvement based on functional requirement

TIME FRAME

- 4 to 8 hours

MATERIALS AND TOOLS

Materials

- Slides of proposed FAST Diagram / Goal and System Modelling
- Signed off VA Report (VA FAST Diagram / Function Analysis)
- Approved Project Brief including SOA
- Bill of Quantities / Specifications / PDA (for identifying elements / components of design
- Completed template : Information Phase Template
- Generic functions lists from previous VE Studies or other references

Tools and Techniques:

- Function Analysis Template
- Function Analysis System Technique (FAST Diagram)
- Goals and Systems Modelling
- Functional Space Diagramming (User Flow Analysis; Spatial Adjacency)

Understand the project / spaces / elements / components / systems from functional perpective; What it must do, rather than how it is being designed

In preparation of conducting Function Analysis Phase, you may compile and refer to function descriptions (at project / space / element / component / system level) of previous studied projects

B2

Function Analysis Phase Activities	Tasks	Time Allowed
A Brief on Function Analysis Phase	i. You are required to conduct briefing on function analysis phase (purpose, activities, expected outputs)	15 minutes
B Verify project functions	i. Present proposed FAST diagram / project function (as prepared at Pre Lab Stage) ii. Verify proposed FAST diagram / project functions iii. Verify required functions and expected deliverables using Goal and System Modelling iv. Identify and highlight value mismatches (if any) mainly on project functions and project deliverables	Half to 1 hour (including presentation)
C Analyse function of space / element / component / system	i. Conduct briefing on Function Analysis Phase template ii. Identify, analyse, discuss and record relevant functions in approriate Function Analysis Phase template: - identify types of function (basic function, secondary function or required secondary function) - identify area / cost - identify user capacity / specification - identify adjacency / user flow / operational process iii. Encourage lab members to identify and highlight value mismatches and potential value improvement in relation to spaces / elements / components / systems including cost / adjacency / flow etc. iv. Allow plenary session to present findings on Function Analysis Phase template	3 to 6 hours (including presentation)

Facilitation team to discuss and propose FAST diagram / Goal and System Modelling at Pre Lab Stage

Time allocated for function analysis may vary depending on project complexity and study scope. You may allocate more time as neccessary.

You may use Cost Worth Index tool to identify cost mismatches

CREATIVE PHASE

PURPOSE

- Generate broad list of creative and innovative ideas as alternative ways to perform functions and enhance value of the project

TIME FRAME

- 3 to 5 hours

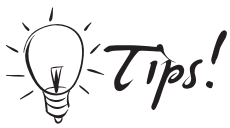
MATERIALS AND TOOLS

Materials

- Slides of Creative Phase Briefing
- Prioritized CVS
- Verified FAST Diagram
- Completed Templates: Information Phase & Function Analysis Phase
- Project Documents: Project Brief, Drawings, Bill of Quantities (BQ), Specification, Technical Report etc

Tools and Techniques:

- Brainstorming (Free Wheeling, Slip Method, Round Robin etc)
- Creative and Evaluation Phase Template



If possible, try to conduct/ schedule Creative Phase in morning session where the body and mind are active and fresh towards generating ideas

Brainstorming session shall be conducted in a condusive and harmonious environment to encourage creativity and innovation in generating ideas

B3

Creative Phase Activities	Tasks	Time Allowed
A **Brief on Creative Phase**	You need to brief and set ground rules on Creative Phase (purpose, activities, expected outputs)	15 minutes
B **Generate alternative ideas to the original design proposal / specifications**	i. Brief on Creative and Evaluation Phase Template (focus on Creativity Phase) ii. Ask group to generate and record ideas in the template iii. Encourage group to refer information as recorded in Information Phase and Function Analysis Phase Template iv. Allow plenary session for groups to present generated ideas.	3 to 5 hours hours (including presentation)

Remember!
Go for quantity !
Judge later.

For time effectiveness, you may combine this presentation with Evaluation Phase plenary session.

EVALUATION PHASE

PURPOSE

- Shortlist the generated ideas into list of potential ideas for value improvement

TIME FRAME

- 2 to 3 hours

MATERIALS AND TOOLS

Materials

- Slides of Evaluation Phase Briefing
- Prioritized CVS
- Verified FAST Diagram
- Completed Templates: Information Phase, Function Analysis Phase & Creative & Evaluation Phase template (focus on Creative Phase)
- Project Documents: Project Brief, Drawings, Bill of Quantities (BQ), Specification, Technical Report etc

Tools and Techniques:

- CFTE Criteria:
  Client Acceptability, Functional Suitability, Technical / Time Feasibility and Economical Feasibility
- EDI Categorization (Evaluate, Discard, Information)
- Creative and Evaluation Phase Template
- Group Consensus
- Multi voting
- Weight Evaluation Matrix

Seek the best ideas, not perfection

Participation of client representative is crucial in Evaluation Phase to facilitate judgement and consensus

B4

Evaluation Phase Activities	Tasks	Time Allowed
A **Brief on Evaluation Phase**	You need to brief and set ground rules on Evaluation Phase (purpose, activities, expected outputs)	15 minutes
B **Evaluate to shortlist the generated ideas for further development and evaluation.**	i. Brief on Creative and Evaluation Phase Template (focus on Evaluation Phase) ii. You will ask group to judge ideas based on CFTE Criteria iii. Then ask group to categorize the ideas into three categories using EDI Categorization: • **Evaluate (E): Potential Idea.** - Ideas complying to all CFTE Criteria can be judged as 'Evaluate' / Potential Idea. - Ideas not complying to Technical Feasibility and / or Economical Feasibility can still be considered under this category. • **Discard (D): Non Potential Idea.** - Ideas with non compliance to Client Acceptability and / or Functional Suitability can be judged as 'Discard'; • **Information (I): Potential Idea for future / other project.** - Ideas may not be evaluated and considered as 'Information' at group's and/or Lab's discretion iv. Ask group to include remarks for 'D' and 'I' ideas as the basis of judgement / categorization.	2 - 3 hours (including presentation)
C **Obtain consensus on the categorized ideas**	i. Allow plenary session for group to present and obtain consensus on categorization and shortlisting of ideas. The shortlisted ideas are 'E' ideas. ii. At the end of plenary session, you may summarize and tabulate total numbers of 'E', 'D' and 'I' ideas as categorized.	

An idea may be considered as "I" when the change implication on cost / time / quality / resources / risk etc is not advantageous for the project at the point of evaluation.

New ideas generated at this stage are still open for consideration and evaluation

DEVELOPMENT PHASE

PURPOSE

- Analyse further the viability of ideas through developing them into workable solutions for recommending best or preferred options

TIME FRAME

- 8 to 14 hours

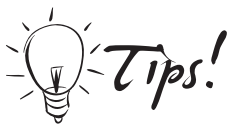
MATERIALS AND TOOLS

Materials

- Slides of Development Phase Briefing
- Completed Templates: Information Phase, Function Analysis Phase, Creative and Evaluation Phase
- Project Documents: Drawings, Bill of Quantities (BQ), Specification, Technical Report etc
- Others: JKR Schedule of Rates, JKR Building Rates Per Square Metre, Similar Project Documents etc

Tools and Techniques:

- Group Consensus
- Development Phase Template
- Summary of Recommended Ideas Template
- Sketches (existing design, design option etc)
- Calculation (design, cost etc)



Development Phase involves time consuming activities/tasks. Ensure adequate time is allocated for this phase

B5

Development Phase Activities	Tasks	Time Allowed
A **Brief on Development Phase**	You need to brief and set ground rules on Development Phase (purpose, activities, expected outputs)	15 minutes
B **Develop and further evaluate shortlisted ideas into workable options and to determine best solutions**	i. Brief on Development Phase Template ii. You will ask group to develop details of shortlisted ideas against original design / proposal, in terms of: - Advantages & Disadvantages - Cost Implication (calculations on the original ideas and evaluated ideas) - Sketches of ideas / amendment (where necessary with appendices) - Innovativeness - Risks and Constraints iii. Then, ask group to evaluate shortlisted ideas and recommend best feasible options (YES / NO)	6 - 8 hours
C **Obtain consensus on the best solutions**	i. Allow plenary session for group to present developed ideas ii. You need to ask lab to select the most feasible option (wherever necessary) iii. Obtain lab consensus on best solutions as lab recommended ideas (YES / NO)	1 - 2 hours

Wherever necessary, multiple ideas may need to be combined and developed together as solution (by lab groups)

Tasks of developing ideas may be distributed among team members to expedite the process

Ensure team members to complete the templates as required

B5

Development Phase Activities	Tasks	Time Allowed
D **Summarize all recommended ideas and study findings**	i. Group will list all lab recommended ideas ii. You will summarize all groups' recommended ideas and study findings iii. Review study model(s) - (Space/Cost/ Quality or others): - Compare outcomes against study model(s) - Identify implication of reviewed study model(s)	1-2 hours
E **Develop Action Plan for post lab activities**	i. Identify task, target date and responsible parties for further actions ii. You need to obtain inputs and agreement from responsible parties on the action plan	Half to 1 hour
F **Review achievement of VE Study Objectives**	i. Assess achievement against the predetermined VE Study Objectives ii. Identify lessons learned and improvements (where applicable)	Half to 1 hour

Select 'YES' ideas only as lab recommended ideas on Development Phase Template

The tasks may be delegated to Lab team members (e.g. To QS for project cost / PDA review)

This activity may be conducted concurrently with earlier activities

PRESENTATION PHASE

PURPOSE

- Present and gain acceptance from stakeholder or decision maker to proceed with the implementation of VE recommendations.

TIME FRAME

- 1 to 2 hours

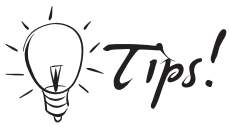
MATERIALS AND TOOLS

Materials

- Slides of Presentation Phase Briefing
- Slides / documents of VE Lab Findings:
- Summary of total numbers of Generated / Evaluated / Recommended Ideas
- Completed templates of all lab phases
- List of Recommended Ideas
- Reviewed VE Study Model(s)
- Developed Action Plan
- Achievement of VE Study Objectives
- Lessons Learned
- CVS
- Others

Tools and Techniques:

- Presentation
- Feedback
- Lab Consensus
- VE Lab Feedback Form

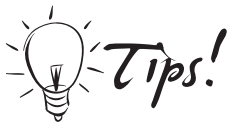


Present to "sell" VE Study Recommendations, both "hard" and "soft" findings

It is adviseable to consolidate VE Lab outputs after each lab phase throughout the lab process to facilitate presentation phases

B6

Presentation Phase 6 Activities	Tasks	Time Allowed
A **Brief on Presentation Phase**	You need to brief on Presentation Phase (purpose, activities, expected outputs) and VE reporting process at Post Lab Stage	5 minutes
B **Presentation of VE Study recommendations and findings**	i. Allow plenary session for Presentation Phase. ii. Then, you will present initial VE Study report focusing on (not limited to): - VE Study Objectives - Project Information eg. Project Objectives, Project Team and Location - VE Study Model(s) - Compliance of VA Recommendation (VE against VA) - Client Value System (CVS) - Project Functions (FAST Diagram) - VE Study Scope - Summary of total numbers of Generated / Evaluated / Recommended Ideas - List of Recommended Ideas - Reviewed VE Study Model(s) - Summary of VE Study findings including compliance of VE outcomes against VA or any other approvals - Action Plan - Achievement of VE Study Objectives - Lessons Learned - Completed templates of all lab phases iii. Obtain feedbacks and reviews from lab team members/ stakeholders on presented initial report	1 - 2 hours
C **Obtain acceptance from lab team members / stakeholders (wherever applicable)**	Finally, you shall obtain consensus from lab team members / stakeholders on the presented initial VE Study report.	15 minutes



VE Study findings will be collated throughout VE Lab Phases

POST LAB STAGE

PURPOSE

- Prepare and submit VE Report
- Monitor and assess implementation on VE Study recommendations and findings
- Assess performance of VE Study implementation

TIME FRAME

- 2 to 3 weeks (for reporting only)
- Duration of other Post Lab activities are dependent on implementation of VE recommendation & feedbacks from stakeholders

MATERIALS AND TOOLS

Materials

For finalizing VE Report:

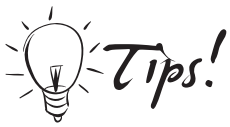
- Initial VE Study report
- Other additional information / document as required

For other Post Lab Activities:

- Tender / Contract Documents (Drawings, Bills of Quantities, Specification, Technical brief)
- Project cost (based on tendered cost / contract cost)
- Project work programme
- Others as required

Tools and Techniques:

- VE Report documention format
- VE Post Lab Action Plan Report
- VE Post Lab Compliance Report
- VE Study Performance Report

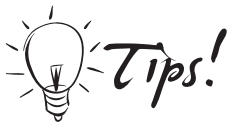


An extensive VE initial report prepared during lab will be facilitate final report writing

Keeping good rapport with PM / HODT / Project Team will facilitate information / data gathering during Post Lab Stage

C

Post Lab Activities	Tasks	Time Allowed
A **Document VE Study outputs**	i. You need to consolidate initial VE Study report and other outputs ii. Finalize VE Report iii. If necessary, you will present VE Report to Client / Stakeholder iv. You need to obtain agreement from relevant stakeholders and formalize the VE report	2 to 3 weeks
B **Disseminate VE Study Report**	i. Submit VE Study Report to Client for dissemination to other Stakeholder / relevant parties	
C **Follow-up Agreed Action Plan**	i. Monitor implementation of Action Plan by the Client / PM / HOPT and others ii. Update the status of Action Plan iii. Assess Action Plan compliance and propose improvement where applicable iv. Where necessary, you will advise Client / PM / HOPT or responsible parties to take necessary action to improve Action Plan	
D **Monitor and assess implementation on VE Study recommendations and findings**	i. Monitor (periodic checking) implementation of recommended ideas and findings in project ii. Assess the compliance of recommended ideas and other findings	
E **Assess performance of VE Study implementation**	i. Assess overall performance of VE Study for the project ii. Then, communicate assessment of VE Study performance and lessons learned to Stakeholder / Clients or other interested parties iii. Finally, propose improvement of VE Study implementation based on assessment / lessons learned	



Ensure report is submitted on the agreed date in the Action Plan

Carry out these task as early as possible (eg: right after project is tendered) for effective assessment

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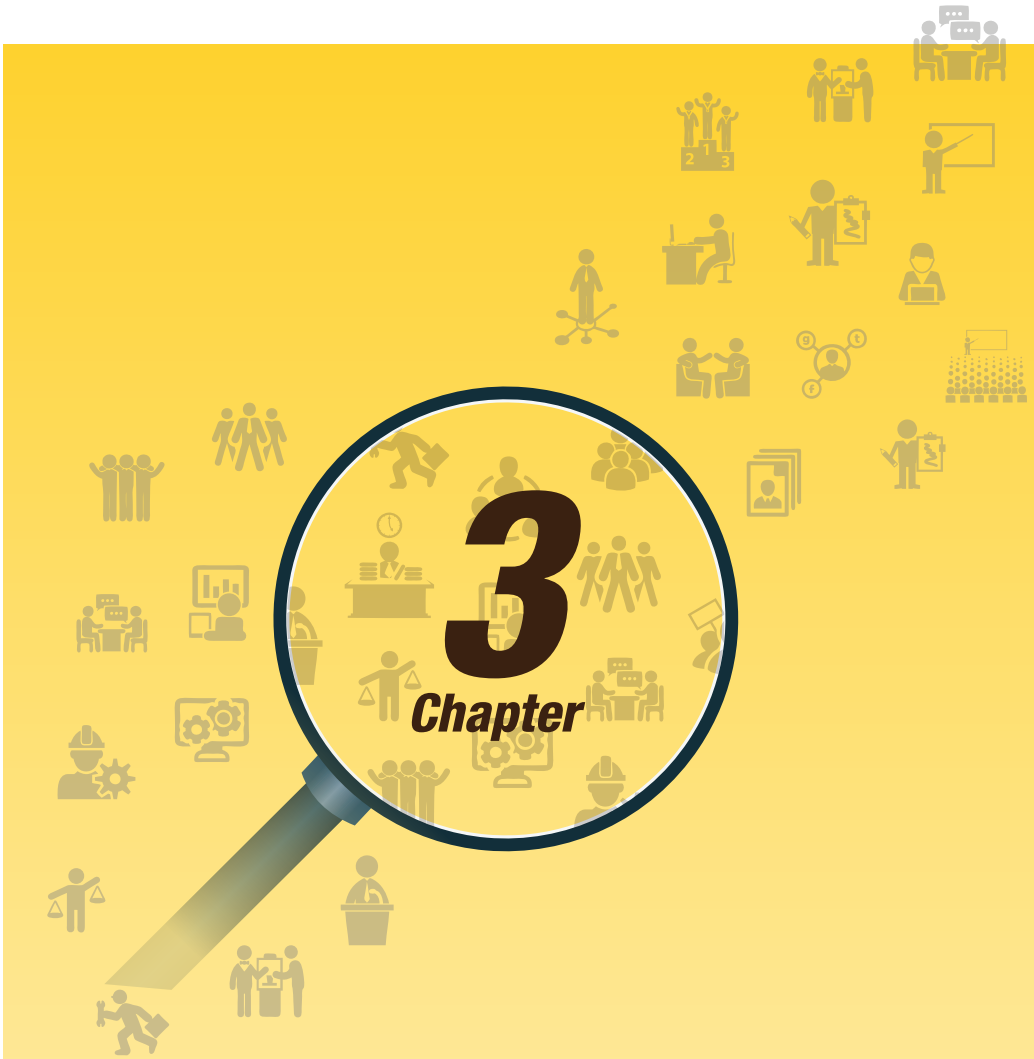

VALUE MANAGEMENT TOOLBOX & RESOURCE TRUNK

VM Toolbox

This section describes selected tools and techniques commonly used in Value Engineering (VE) Study facilitation by JKR. They are related from VM best practices and contextualized to VM studies in public projects. Some of these tools and techniques are applicable in other forms of VM studies. However, they are not exhaustive and not limited to what have been suggested in this chapter.

PURPOSE

HOW TO USE

VE Study Pre Requisite Form *(JKR.VE.Pre.01)*

- Assess readiness of the project for VE Study implementation.

- Ascertain (tick boxes) pre-requisites are fulfilled prior VE Study
- Propose suitable date for VE Study and/or appropriate actions accordingly

VE Study Pre Lab Checklist Form *(JKR.VE.Pre.02)*

- Ensure sufficiency of information / documents / materials to conduct VE Study
- Ensure Pre-Lab activities are carried out

- Ascertain (tick boxes) all pre-lab activities comprising the followings are carried out:
  - Plan and programme for VE Study
  - Collate relevant information / documents / materials
  - Arrange VE Lab logistics, required equipment and room layout
  - Conduct orientation session (if necessary)
- Arrange suitable date for pre-lab activities such as orientation session and site visit

A.C.I.D. Test (VE Lab Participant Identification Form) *(JKR.VE.Pre.03)*

PURPOSE

- Assist Client/PM/HOPT (JKR) to determined VE Lab participants to be invited
- Ensure clear roles and responsibilities in VE Lab

HOW TO USE

- Propose listing of VE Lab participants
- Determine lab team composition based on four (4) criteria according to their roles:

	ROLES	DESCRIPTION	EXAMPLES
A	Authorize	Those who have the authority to make decisions during the lab	Client, PM/HOPT(JKR), EPU
C	Consult	Those who have to be consulted on specific area during the lab	Designer / HODT(JKR), Authority, Utility Company, User
I	Inform	Those who only need to be informed of the lab outcome	Low impact stakeholder
D	Do	Those who carry out major tasks recommended by Lab	Designer / HODT(JKR), PM/HOPT (JKR)

Table 3.1 A.C.I.D. Criteria

- Inform Client / PM / HOPT (JKR) total number of VE Lab team members and facilitators

Information Phase Template *(JKR.VE.Lab.02)*

PURPOSE

- Capture project parameters and issues needed to be addressed in the project.

HOW TO USE

- Indicate particulars i.e. project name, level of study, scope of study, group and date.
- Record individual project parameters and related issues of items under scope of study in softcopy template.
- State source of information and references in Remarks.

PURPOSE

HOW TO USE

Function Analysis Phase Template *(JKR.VE.Lab.03a & 03b)*

- Capture relevant functions of the project at respective level of study (projects/spaces/ elements/components/ systems).

- Record function analysis for each item under scope of study in softcopy template.
- Describe functions using active verb and measurable noun definition.
- Identify and record types of functions:
  - basic function
  - secondary function
  - required secondary function
- Identify and record for each item:
  - area and/or cost
  - *user capacity and/or specification
  - *adjacency and/or *user flow and/or *operational process
- Highlight possible mismatch in Remarks

** Applicable for building project.*

Creative Phase Template *(*JKR.VE.Lab.04)*

- Capture ideas generated during Creative Phase.

- Record generated ideas for each item under scope of study in softcopy template

** This template will be used for Creative Phase and Evaluation Phase*

Evaluation Phase Template *(JKR.VE.Lab.04)*

PURPOSE

- Evaluate generated ideas according to set criteria.
- Categorize evaluated ideas for further development.

HOW TO USE

- Record outputs for each item under scope of study in softcopy template.
- Check for compliance of each idea against four (4) evaluation criteria as described below:

	CFTE CRITERIA	DESCRIPTION
C	Client Acceptability	The proposed idea is accepted by the client
F	Functional Suitability	The proposed idea fulfills required function
T	Technical Feasibility	The proposed idea is technically feasible for implementation within project time frame
E	Economical Feasibility	The proposed idea is economical to implement / cheaper / insignificant cost increase

Table 3.2 C.F.T.E Criteria

- Categorize each idea according to EDI Categorization

CATEGORIZATION		DESCRIPTION
E	Evaluate	Potential idea for development
D	Discard	Non-workable idea i.e. idea not acceptable by Client and / or functionally not suitable
I	Information	Good idea but not feasible for current project. Can be considered for future or other projects

Table 3.3 E.D.I Criteria

- Record reasons for “Discard” and “Information” ideas in Remarks

Development Phase Template *(JKR.VE.Lab.05)*

PURPOSE

- Capture details of further development of each “Evaluate” Idea
- Indicate recommendation of each idea.

HOW TO USE

- Record details of development and recommendation of each “Evaluate” Idea in softcopy template
- Describe details of original design (provide sketches if necessary) and cost breakdown of each idea
- Describe details of evaluated idea including design (provide sketches if necessary) and cost breakdown of each idea
- Determine cost implication (saving or extra) of each evaluated idea
- Describe the advantages and disadvantages, innovations and risks of implementing each idea
- Select recommendation (YES/NO) of each idea based on lab consensus

PURPOSE

HOW TO USE

Summary of Recommended Ideas Template *(JKR.VE.Lab.06)*

- Capture summary of recommended ideas
- Capture nett cost saving or extra of all recommended ideas

- List the recommended ideas including the cost implication in softcopy template
- Sum up total cost of savings or extra of all recommended ideas.

VE Post Lab Action Plan Report *(JKR.VE.Post.01)*

- Capture status of implementation of agreed action plan

- Record details of agreed action plan (i.e. output, responsibility and target date of each activity) in softcopy template
- Record actual completion date or status of implementation
- Record observation and highlight any deviation in Remarks.

VE Post Lab Compliance Report *(JKR.VE.Post.02)*

- Capture status of implementation of recommended ideas

- Record details of recommended ideas in softcopy template
- Record actual implementation of recommended ideas
- Record observation and highlight any deviation in Remarks.

Client Value System (CVS)

PURPOSE

- Identify and prioritize CVS components or value criteria of the project.
- Guide lab team members to understand, audit and translate the prioritized value criteria into design / project from time, cost and quality perspectives.

HOW TO USE

- Identify, select and propose relevant project value criteria to client. Listed below are typical project value criteria (Adapted from Kelly, Male & Graham, 2004).

VALUE CRITERIA	DESCRIPTION
Capital expenditure (CAPEX)	Capital costs of the project - is the budget being considered tight or flexible?
Operational expenditure (OPEX)	Operating and maintenance costs of the completed project - is there flexibility in operating cost or is it required to be controlled to a minimum?
Time	Time required from the present project completion and handed over to client for business -is time is 'of the essence' or 'at large'?
Comfort	Physical and psychological impact of the facility on user - consider how facility supports the business from purely utilitarian terms to high degree of affluence
Safety / Security	Extent of safety/security required for facility to support business - consider level of safety/security required from basic function requirements (as stated in standards) to higher performance.
Aesthetic / Esteem / Image	The extent to which client is willing to commit resources to make aesthetics statement or to portray esteem of organization - Consider the need for esteem from high degree to attract admiration to no significance
Flexibility / Expandability	The extent to which the project have to accommodate changes - consider from being highly flexible to unlikely to change to any extent.
Environmental Impact	The extent to which the project is sensitive to the environment and its impact - consider the degree of approach to highly sympathetic to minimum observation
Politics / Community	The extent to which community / users / popularity issues are important to client - consider the need from having to make popular decisions to having no concerns towards issues.

Table 3.4 Client Value Criteria

- Apply Paired Comparison Tool to prioritize selected value criteria. As the project owner, only client representatives will be involved in CVS prioritizing exercise to ensure project value is captured without influence by other parties.
- Verify the ranking of the prioritized value criteria with client. The result will illustrate the whole Client Value System for the project.
- Interpret the result of CVS in terms of tangible outputs or deliverables expected to be achieved for the project.
- Share CVS result with whole Lab team to understand, audit and translate the prioritized value criteria into design/project.

Paired Comparison

PURPOSE

- Prioritize variables by comparing the importance of one variable to another.
- Indicate ranking of variables to summarize priority as in CVS exercise.

HOW TO USE

- Use matrix diagram, insert and label all selected variables for comparison the alphabetical order (see below - An example of the tool application for CVS exercise).
- Undertake comparison between two variables by asking appropriate questions to relevant party; to decide which variable is more important between the two.
- Give a score of 1 to the more important variable and no score to the less important between the two. Insert the score in the respective boxes (Example: 1A).In some circumstances, variables having equal importance shall be given a score of 0.5 for each. (Example: 0.5A, 0.5B).
- Repeat this exercise for all pairs of variables in the matrix.
- Calculate total score for each variable and rank all variables according to priority.

A. Capital Cost (CAPEX)							
1A	**B. Operational Cost (OPEX)**						
1C	1C	**C. Time**					
1A	1B	1C	**D. Community**				
0.5A 0.5E	1B	0.5C 0.5E	1E	**E. Safety**			
1A	1B	1C	0.5D 0.5F	1E	**F. Flexibility**		
1A	1B	1C	0.5D 0.5G	1E	0.5F 0.5G	**G. Asthethic**	
0.5A 0.5H	0.5B 0.5H	0.5C 0.5H	0.5D 0.5H	0.5E 0.5H	0.5F 0.5H	1H	**H. Comfort**

A	B	C	D	E	F	G	H	
5	4.5	6.5	1.5	4.5	1.5	1	3.5	**Total**

SCORE
1 = More Important; **0.5** = Equal Important; **No Score** = Less Important

1	Time	6.5
2	Capital Cost (CAPEX)	5
3	Operational Cost (OPEX)	4.5
4	Safety	4.5
5	Comfort	3.5
6	Community	1.5
7	Flexibility	1.5
8	Asthetic	1

Figure 3.1 An Example of Paired Comparison Application For CVS (Building Project)
(Adapted from Kelly, Male & Graham, 2004).

Function Analysis System Technique (FAST)

In VM practice, Function Analysis System Technique or FAST diagram is the most commonly used technique to define functions. There are several types of FAST Diagram which can be applied at various levels of study; strategic / project / space / element / system / component.

Strategic FAST Diagram

PURPOSE

- Illustrate the whole project functions and linkages in a simple yet comprehensive form.
- Guide lab team members to review and verify project functional requirements, linking the project objectives to the required strategic and tactical functions.
- Provide basis to identify any function mismatch and to strategize or improve project solutions.

HOW TO USE

- Identify possible project functions through brainstorming exercise with team members; express functions using an active verb and a descriptive noun. Record them on sticky-notes to facilitate categorization activity.
- Categorize the identified functions into 4 quadrants (Strategic-Needs, Strategic-Wants, Tactical-Needs, and Tactical-Wants), and rank according to priority (from high-order to low-order rank) as below:

Strategic Needs	**Tactical Needs**
Strategic Wants	**Tactical Wants**

Figure 3.2 The Functions Quadrants (Adapted from Kelly, Male & Graham, 2004).

- Arrange the identified functions to construct a logic order of Strategic FAST diagram according to Needs-to-Wants rank and at appropriate levels (Strategic / Tactical). Then link project objectives to functions at appropriate levels as below::

  - Level 0 – Project Objectives
  - Level 1 – Strategic Functions
  - Level 2 – Tactical Functions
  - Level 3 – Tactical Functions (Extension of Level 2 functions, if necessary)

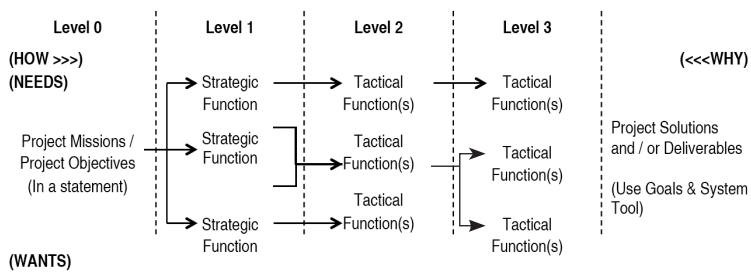

Figure 3.3 Strategic FAST Diagram (Adapted from Kelly, Male & Graham, 2004)

- Check logic of Strategic FAST Diagram by verifying relationships of “HOW” and “WHY”. When checking from left to right, the sense of logic of function answers the question of “HOW”; and in turn answers the question of “WHY” when working from right to left. Review, add or remove functions or links, and refine project objective (project mission) statement, where necessary.
- Verify Strategic FAST Diagram with team members and use diagram in addressing any mismatch or proposing improvements on functions.

Technical FAST Diagram

PURPOSE

- Illustrate linkages between the basic technical function and other technical functions of the project in a diagrammatic form.
- Guide lab team members to review and verify whether the function requirements are fulfilled by the proposed technical solutions.
- Provide basis to identify any function mismatch and to strategize or improve technical solutions.

HOW TO USE

- Identify possible technical functions through brainstorming exercise with team members; express them using an active verb and a descriptive noun. Record them on sticky-notes to facilitate functions arrangement activity.
- Identify Higher Order Function and place at the left side which is outside of study scope limit in the Technical FAST diagram (see example in Diagram 3.4).
- Identify Basic Function of the project and place within the study scope limit, at the immediate right to the identified Higher Order Function.
- Identify and arrange Secondary Function(s) in a logical high-to-low order, place from left-to-right sequence to form a critical path line.
- Identify and arrange other functions in the FAST diagram:
- Parallel Functions at below of Basic / Secondary Functions (below critical path).
- Design Objectives at above of Basic Function (above critical path).
- Desired Objectives at the top right of the diagram (above critical path).
- Check logic of the critical path by verifying relationships of “HOW” and “WHY”. When checking from left to right, the sense of logic of function answers the question of “HOW”; and in turn answers the question of “WHY” when working from right to left.
- Review, add or remove functions or links, where necessary.
- Verify Technical FAST Diagram with team members and use diagram in addressing any mismatch or proposing improvements on functions.

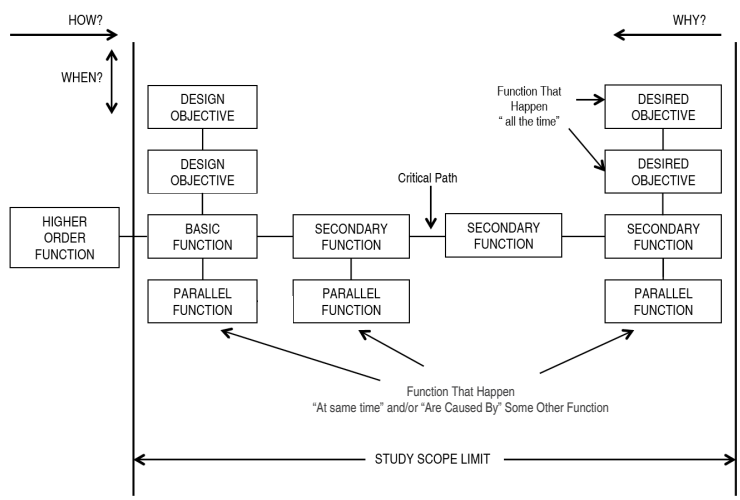

Figure 3.4 Technical FAST Diagram (Adapted from Che Mat, 2002 & Kelly, Male & Graham, 2004)

Goals and Systems Modelling

PURPOSE

- Strategize or audit project solutions and/or deliverables based on function analysis of Strategic FAST Diagram
- Indicate any mismatch between required functions and project solutions / deliverables.

HOW TO USE

- List the required functions taken from the far right of tactical function of the Strategic FAST Diagram (at Level 2 or Level 3 as indicated in Figure 3.3). The listed tactical functions are identified as "Goals".
- List the deliverables identified as "Systems" which can be carried to fulfill the "Goals" / tactical functions.
- Match the "Goals" with "Systems" to illustrate the relationship between the required functions and project solutions / deliverables / facilities / services / specified design features etc. and to address any mismatch or missing / additional link between "Goals" and "Systems". Use model for illustration as Figure 3.5 below.

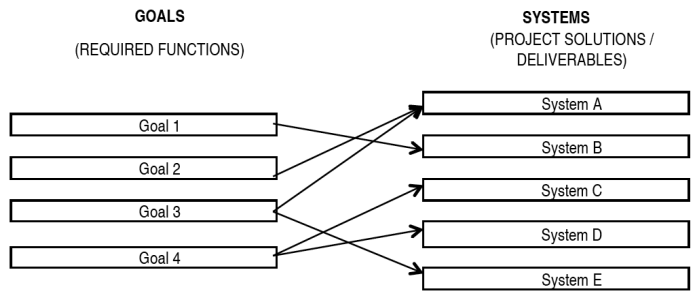

Figure 3.5 Goal and System Modelling (Adapted from Kelly, Male & Graham, 2004)

User Flow Analysis

PURPOSE

- Maps out the chronology of user flow within the facility.
- Provide clear descriptions of operational flow to ensure required functional spaces are provided accordingly.

HOW TO USE

- Identify key users of building / facility / space.
- Use flow chart diagram to record each user flow within the facility (as illustrated in the example below).
- Use the completed flow charts to review functional requirements and to ensure functional spaces are provided in the design.

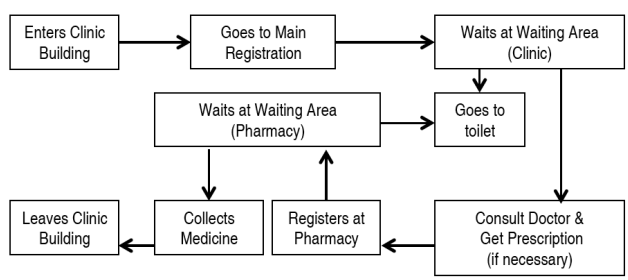

Figure 3.6 An Example of User Flow Analysis For First Time Patient (Walk In) of District Health Clinic (Adapted from Kelly, Male & Graham, 2004)

Spatial Adjacency Matrix

PURPOSE

- Audit the adjacency requirement of functions / spaces in the proposed design to highlight any mismatches.

HOW TO USE

- Identify spaces to be analyzed and insert each space in the Adjacency Matrix Diagram (similar to the Paired Comparison technique described earlier).

Entrance						
+3	**Clinic Registration**					
+3	+3	**Clinic Waiting Area**				
-2	+1	+2	**Doctor Room**			
0	+1	+1	0	**Pharmarcy Waiting Area**		
0	-1	-1	0	+3	**Pharmacy**	
-2	+2	+2	-3	+1	-3	**Toilet**

Figure 3.7 An Example of Paired Comparison Application for Spatial Adjacency Matrix of District Health Clinic (Adapted from Kelly, Male & Graham, 2004)

- Use Adjacency Matrix Diagram to rate each space in terms of adjacency requirement on an index scale of +3 to -3 as describe at table below

MUST BE FAR	FAIRLY FAR	QUITE FAR	NEUTRAL	QUITE ADJACENT	FAIRLY ADJACENT	MUST BE ADJACENT
-3	-2	-1	0	+1	+2	+3
Completely separated and / or functionally not related	Not within surrounding due to functional requirement	Not within surrounding but function quite related	Can be anywhere; within or not within surrounding	Within surrounding but functionally not so related	Within surrounding and functionally related	Must be close and functionally very related

Table 3.5 Measurement Scale of Spatial Adjacency Matrix

- Review proposed design against the rating result, focusing on spaces rated +3, +2, -2 and -3. Address any non-compliances of adjacency requirement and propose remedy or improvement to the design.

Facilitator Resource Trunk

In addition to the VE Lab equipment listed in JKR.VE.Pre.02 (VE Study Lab Checklist Form), you need to bring along supplies and items required for specific activities you have planned during each lab, such as;

Stationary

- Masking tape, glue, or scissors
- Stapler
- Pens & pencils
- Paper clips or rubber bands
- Thumbtacks or push pins
- Rulers
- Blank paper,
- Group table tagging
- Post-it notes
- Magnet Clip

ICT

- Thumbdrive
- Laptop
- External Harddrive
- Portable broadband
- Projector
- Laser Pointer

Others

- Hand-outs,(Blank template, Lab Agenda, report sample, Motivation quotes)
- Extension cord and power strip
- Motivation Poster

REFERENCES

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APPENDICES

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VE LAB AGENDA SAMPLE 1

Project :
Date :
Venue :

	Session		
	Morning	**Afternoon**	**Evening**
	8.30am-1.00 pm	**2.00pm-5.30pm**	**8.00pm-10.30pm**
DAY 1	Lab briefing & Information Phase	Information Phase	Function Analysis Phase
DAY 2	Function Analysis Phase	Creative Phase	Creative Phase/ Evaluation Phase
DAY 3	Evaluation Phase	Development Phase	Development Phase
DAY 4	Development Phase	Presentation Phase	

DAY 1

Session	Activity	Output
Morning	**Registration**	List of attendees
	Lab Opening Session	Team building
	INFORMATION PHASE	
	Brief & verify VE Lab Agenda	Verified VE Lab Agenda
	Brief & verify VE Study Objectives	Verified VE Study Objectives
	Brief project Information; • **VA / relevant government approval** • **Client needs and requirement** • **Project objectives** • **Project background (scope, status, location, timeline, team, etc)** • **Proposed design from all disciplines** • **Project cost estimates** • **Project risks** • **Authorities requirements**	Clarified project informations Identified compliance/ deviation from VA
	Verify Project Objectives and Project Outcomes	Verified Project Objectives and Project Outcomes
	Confirm proposed VE Study model(s)	Confirmed VE Study Model(s)
	Inform CVS	Accepted CVS

Session	Activity	Output
Afternoon	**INFORMATION PHASE**	
	Confirm VE Study scopes and Lab working groups	VE Lab working group formation
	Establish project parameters to be studied	Completed Information Phase template
	Present Information Phase	Presentation by groups
Evening	**FUNCTION ANALYSIS PHASE**	
	Brief on Function Analysis Phase	
	Verify project Functions	Verified project function
	Analyse function of space/ element/ component/ system	Completed Function Analysis Phase Template

DAY 2

Session	Activity	Output
Morning	**FUNCTION ANALYSIS PHASE**	
	Analyse function of space/ element/ component/ system (Continue)	Completed Function Analysis Phase Template
	Present Function Analysis templates	Presentation and consensus
Afternoon	**CREATIVE PHASE**	
	Brief on Creative Phase	
	Generate alternate ideas to the original design proposal / specifications	Broad list of creative and innovative ideas
Evening	**CREATIVE PHASE**	
	Generate alternate ideas to the original design proposal / specifications (Continue)	Broad list of creative and innovative ideas
	Present Creative Phase templates	Presentation and consensus

DAY 3

Session	Activity	Output
Morning	**EVALUATION PHASE**	
	Brief on Evaluation Phase	
	Evaluate to shortlist the generated ideas for further development and evaluation	Judged ideas and categorized ideas
	Present Evaluation Phase templates	Presentation and consensus
Afternoon	**DEVELOPMENT PHASE**	
	Brief on Development Phase	
	Develop and further evaluate shortlisted ideas into workable options and to determine best solutions	Detail evaluation of ideas
Evening	**DEVELOPMENT PHASE**	
	Develop and further evaluate shortlisted ideas into workable options and to determine best solutions (Continue)	Detail evaluation of ideas

DAY 4

Session	Activity	Output
Morning	**DEVELOPMENT PHASE**	
	Present Development Phase templates	Recommended ideas
	Summarize all recommended ideas and study findings	Summary of recommended ideas and study findings
	Develop Action Plan for post lab activities	Agreed Action Plan
	Review achievement of VE Study Objectives	Statement of VE Study achievement
Afternoon	**PRESENTATION PHASE**	
	Brief on Presentation Phase	
	Presentation of VE Study recommendations and findings	Presented findings
	Obtain acceptance from lab team members / stakeholders	Input for VE Study Report

VE LAB AGENDA SAMPLE 2

Project :
Date :
Venue :

	Session	
	Morning	**Afternoon**
	8.30am-1.00 pm	**2.00pm-5.30pm**
DAY 1	Lab briefing & Information Phase	Information Phase
DAY 2	Function Analysis Phase	Function Analysis Phase
DAY 3	Creative Phase	Evaluation Phase
DAY 4	Development Phase	Development Phase
DAY 5	Development Phase	Presentation Phase

DAY 1

Session	Activity	Output
Morning	**Registration**	List of attendees
	Lab Opening Session	Team building
	INFORMATION PHASE	
	Brief & verify VE Lab Agenda	Verified VE Lab Agenda
	Brief & verify VE Study Objectives	Verified VE Study Objectives
	Brief project Information; • **VA / relevant government approval** • **Client needs and requirement** • **Project objectives** • **Project background (scope, status, location, timeline, team, etc)** • **Proposed design from all disciplines** • **Project cost estimates** • **Project risks** • **Authorities requirements**	Clarified project informations Identified compliance/ deviation from VA
	Verify Project Objectives and Project Outcomes	Verified Project Objectives and Project Outcomes
	Confirm proposed VE Study model(s)	Confirmed VE Study Model(s)
	Inform CVS	Accepted CVS

Session	Activity	Output
Afternoon	**INFORMATION PHASE**	
	Confirm VE Study scopes and Lab working groups	VE Lab working group formation
	Establish project parameters to be studied	Completed Information Phase template
	Present Information Phase	Presentation by groups

DAY 2

Session	Activity	Output
Morning	**FUNCTION ANALYSIS PHASE**	
	Brief on Function Analysis Phase	
	Verify project functions	Verified project function
	Analyse function of space/ element/ component/ system	Completed Function Analysis Phase Template
Afternoon	**FUNCTION ANALYSIS PHASE**	
	Analyse function of space/ element/ component/ system (Continue)	Completed Function Analysis Phase Template
	Present Function Analysis templates	Presentation and consensus

DAY 3

Session	Activity	Output
Morning	**CREATIVE PHASE**	
	Brief on Creative Phase	
	Generate alternate ideas to the original design proposal / specifications	Broad list of creative and innovative ideas
	Present Creative Phase templates	Presentation and consensus
Afternoon	**EVALUATION PHASE**	
	Brief on Evaluation Phase	
	Evaluate to shortlist the generated ideas for further development and evaluation	Judged ideas and categorized ideas
	Present Evaluation Phase templates	Presentation and consensus

DAY 4

Session	Activity	Output
Morning	**DEVELOPMENT PHASE**	
	Brief on Development Phase	
	Develop and further evaluate shortlisted ideas into workable options and to determine best solutions	Detail evaluation of ideas
Afternoon	**DEVELOPMENT PHASE**	
	Develop and further evaluate shortlisted ideas into workable options and to determine best solutions (Continue)	Detail evaluation of ideas

DAY 5

Session	Activity	Output
Morning	**DEVELOPMENT PHASE**	
	Present Development Phase templates	Recommended ideas
	Summarize all recommended ideas and study findings	Summary of recommended ideas and study findings
	Develop Action Plan for post lab activities	Agreed Action Plan
	Review achievement of VE Study Objectives	Statement of VE Study achievement
Afternoon	**PRESENTATION PHASE**	
	Brief on Presentation Phase	
	Presentation of VE Study recommendations and findings	Presented findings
	Obtain acceptance from lab team members / stakeholders	Input for VE Study Report

FORMAT OF VE REPORT

EXECUTIVE SUMMARY *RINGKASAN EKSEKUTIF*

1.0 **VE STUDY OBJECTIVES** *OBJEKTIF KAJIAN VE*

2.0 **PROJECT INFORMATION** *MAKLUMAT PROJEK*

- 2.1 **Project Objective** *Objektif Projek*
- 2.2 **Project Outcome** *Outcome Projek*
- 2.3 **Project Background** *Latar Belakang Projek*
- 2.4 **Project Current Issues** *Isu-isu semasa projek*
- 2.5 **Project Location** *Lokasi Projek*
- 2.6 **Project Site Photos** *Gambar Tapak Projek*
- 2.7 **Project Team** *Pasukan Projek*
- 2.8 **Project Design Information** *Maklumat Rekabentuk Projek*

3.0 **VA STUDY/ PROJECT APPROVAL** *KETETAPAN KAJIAN VA/ KELULUSAN PROJEK*

- 3.1 **VA Study/ Project Scope and Cost** *Skop dan Kos Kajian VA/ Kelulusan Projek*
- 3.2 **Compliance of VA Study/ Project Approval** *Pematuhan Terhadap Kajian VA/ Kelulusan Projek*

4.0 **VE STUDY (COST/SPACE/ETC) MODEL** *MODEL (KOS/RUANG/DLL) KAJIAN VE*

- 4.1 **Summary Of Study Model (Costs/Spaces/Etc)** *Ringkasan Model Kajian (Kos/Ruang/Dll)*

5.0 **CLIENT VALUE SYSTEM** *SISTEM NILAI KLIEN*

- 5.1 **Analisis Paired Comparison** *Sistem Nilai Klien*
- 5.2 **Description Of Client Value System** *Keterangan Sistem Nilai Klien*

6.0 **PROJECT FUNCTION** *FUNGSI PROJEK*

- 6.1 **Strategic Function Analysis System Technique (FAST) Diagram** *Diagram Strategic FAST*
- 6.2 **Required Functions-Project Deliverables (Goal and System Modelling)**
  Keperluan Fungsi-Hasil Projek (Model Goal and System)

7.0 **VE STUDY SCOPE** *SKOP KAJIAN VE*

8.0 **VE STUDY SUMMARY OF IDEAS** *RINGKASAN IDEA KAJIAN VE*

9.0 **VE STUDY RECOMMENDATION** *CADANGAN KAJIAN VE*

10.0 **REVIEWED VE STUDY MODEL (COST/SPACE/ETC)** *KAJIAN SEMULA MODEL (KOS/RUANG/DLL) KAJIAN VE*

- 10.1 **Summary Of Comparison (Costs/Spaces/Etc)** *Ringkasan Perbandingan (Kos/Ruang/Dll)*
- 10.2 **Justification Of Variance (Costs/Spaces/Etc)** *Justifikasi Perbezaan (Kos/Ruang/Dll)*

11.0 **VE STUDY CONCLUSION** *RUMUSAN KAJIAN VE*

12.0 **POST VE ACTION PLAN** *PELAN TINDAKAN PASCA VE*

13.0 **VE STUDY OBJECTIVES ACHIEVEMENT** *PENCAPAIAN OBJEKTIF VE*

14.0 **LESSONS LEARNED** *IKTIBAR DAN PENGAJARAN*

15.0 **APPENDICES OF VE REPORT** *LAMPIRAN LAPORAN VE*

- 15.1 **VE Lab Agenda** *Agenda Lab VE*
- 15.2 **Lab Attendance** *Senarai Peserta Lab*
- 15.3 **Related Presentations** *Pembentangan berkaitan*
- 15.4 **Risk Register/ Risk Management Plan** *Daftar Risiko/ Pelan Pengurusan Risiko*
- 15.5 **Related Letters** *Surat-surat berkaitan*
- 15.6 **VE Study Template By Phases** *Templat Kajian VE mengikut Fasa*
- 15.7 **VE Study Model Documents (PDA/ SOA etc)** *Dokumen Model Kajian VE*

LIST OF FORMS/ TEMPLATES FOR VE LAB

NO	PRE LAB VE FORMS	FORMS
1	VE Study Pre Requisite	JKR.VE.Pre.01
2	VE Study Pre Lab Checklist	JKR.VE.Pre.02
3	VE Lab Participants Identification (A.C.I.D Test)	JKR.VE.Pre.03

NO	GENERAL FORMS	FORMS
1	Value Engineering Methodology Matrix	JKR.VE.Am.01
2	Participants Attendance list	JKR.VE.Am.02
3	(Integrity Pact) Surat Akujanji	JKR.VE.Am.03
4	Maklumbalas Lab Pengurusan Nilai	JKR.VE.Am.04

NO	LAB VE TEMPLATES	TEMPLATES
1	List of Participants (Group)	JKR.VE.Lab.01
2	Information Phase	JKR.VE.Lab.02
3	Function Analysis Phase (Sheet 1)	JKR.VE.Lab.03a
4	Function Analysis Phase (Sheet 2)	JKR.VE.Lab.03b
5	Creative Phase and Evaluation Phase	JKR.VE.Lab.04
6	Development Phase	JKR.VE.Lab.05
7	Summary of Ideas	JKR.VE.Lab.06

NO	POST LAB VE FORMS	FORMS
1	VE Post Lab Action Plan Report	JKR.VE.Post.01
2	VE Post Lab Compliance Report	JKR.VE.Post.02

	VALUE ENGINEERING ***List of Participants***	Reference : JKR.VE.Am.02 Page No : 1 Issue No : 1 Revision No : 01 Date : AUGUST 2013

PROJECT	
VENUE	
DATE	

NO	NAME	COMPANY	POSITION	TELEPHONE	EMAIL
1					
2					
3					
4					
5					
6					
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22					
23					

JKR	**VALUE ENGINEERING** ***Surat Akujanji***	Reference : JKR.VE.Am.03 Page No : 1 Issue No : 1 Revision No : 1 Date : AUGUST 2013

Nama Projek Dirujuk: _____

_____

Saya/ kami seperti Nama dan No. Kad Pengenalan (Awam/Tentera/Polis) tertera di bawah adalah dengan sesungguhnya dan sebenarnya mengisytiharkan bahawa:-

1. Saya/kami tidak akan mendedahkan apa-apa maklumat sulit berkaitan perolehan Kerajaan kepada mana-mana pihak selaras dengan Akta Rahsia Rasmi 1972 [Akta 88];

2. Saya/kami dengan ini mengisytiharkan bahawa tiada mana-mana anggota atau ahli keluarga terdekat yang mempunyai apa-apa kepentingan dalam mana-mana urusan perolehan yang dikendalikan oleh saya;

3. Saya/kami tidak akan melibatkan diri saya/kami dalam mana-mana amalan rasuah dengan mana-mana pihak yang terlibat sama ada secara langsung atau tidak langsung dalam tender tersebut;

4. Saya/kami tidak akan bersubahat dengan mana-mana pihak sehingga boleh menjejaskan ketelusan dan keadilan semasa proses perolehan;

5. Sekiranya ada sebarang percubaan rasuah daripada mana-mana pihak, saya akan membuat aduan dengan segera ke pejabat Suruhanjaya Pencegahan Rasuah Malaysia (SPRM) atau balai polis yang berhampiran. Saya sedar bahawa kegagalan saya berbuat demikian adalah satu kesalahan di bawah Akta Suruhanjaya Pencegahan Rasuah 2009 [Akta 694]; dan

6. Saya/kami sesungguhnya faham bahawa jika saya melanggar mana-mana terma dalam surat akuan ini, saya boleh dikenakan tindakan di bawah Peraturan-peraturan Pegawai Awam (Kelakuan dan Tatatertib) 1993 – jika berkenaan.

(i) Nama : .....
No. K/P : .....

Tandatangan : .....
Jawatan : .....
Tarikh : .....

(ii) Nama : .....
No. K/P : .....

Tandatangan : .....
Jawatan : .....
Tarikh : .....

(iii) Nama : .....
No. K/P : .....

Tandatangan : .....
Jawatan : .....
Tarikh : .....

(iv) Nama : .....
No. K/P : .....

Tandatangan : .....
Jawatan : .....
Tarikh : .....

	VALUE ENGINEERING ***Maklumbalas Lab Kejuruteraan Nilai***	Reference : JKR.VE.Am.04 Page No : 1/2 Issue No : 1 Revision No : 1 Date : AUGUST 2013

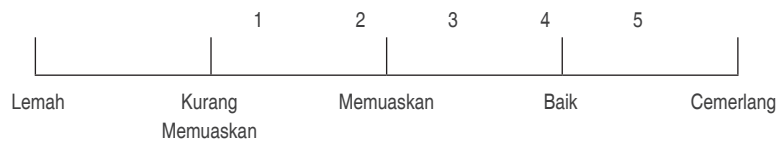
PROJECT	
VENUE	
DATE	

AGENSI	Klien / HODT/ HOPT/ Konsultan / Agensi Kerajaan Luar / Pembekal / Lain- lain:.....

ARAHAN:

Sila bulatkan mengikut skala penilaian yang bersesuaian Contoh : 1 2 3 4 (5)

Skala Penilaian



A. OBJEKTIF DAN AGENDA LAB

1	Pencapaian objektif lab	1	2	3	4	5
2	Susunan agenda lab	1	2	3	4	5
3	Keberkesanan Metodologi lab yang dijalankan	1	2	3	4	5
4	Tempoh lab	1	2	3	4	5

B. FASILITATOR LAB (KESELURUHAN)

1	Penerangan dan teknik penyampaian	1	2	3	4	5
2	Interaksi dengan peserta	1	2	3	4	5
3	Tahap kepakaran fasilitator	1	2	3	4	5
4	Ketepatan masa	1	2	3	4	5

JKR	**VALUE ENGINEERING** ***Maklumbalas Lab Kejuruteraan Nilai***	Reference : JKR.VE.Am.04 Page No : 2/2 Issue No : 1 Revision No : 1 Date : AUGUST 2013

C. PENGURUSAN LAB

1	Keselesaan ruang	1	2	3	4	5
2	Kualiti template/ lab kit	1	2	3	4	5
3	Penyediaan kelengkapan lab dan alat pandang dengar (cth: Printer,Flipchart, Whiteboard dll)	1	2	3	4	5

D. KEURUSETIAAN

1	Urusetia dan penyelarasan lab	1	2	3	4	5
2	Urusan jemputan dan penyampaian maklumat	1	2	3	4	5
3	Makanan dan minuman	1	2	3	4	5
4	Kemudahan lain (cth:penginapan,pengangkutan,internet) Nyatakan.....	1	2	3	4	5

E. FAEDAH PELAKSANAAN

*	Peningkatan nilai Value for Money kepada projek	Tidak Setuju	Neutral	Setuju
*	Peningkatan kefungsian projek	Tidak Setuju	Neutral	Setuju
*	Peningkatan keupayaan membuat keputusan (robust decision making)	Tidak Setuju	Neutral	Setuju
*	Peningkatan komunikasi antara stakeholder projek	Tidak Setuju	Neutral	Setuju
*	Peningkatan kepuasan pelanggan	Tidak Setuju	Neutral	Setuju
*	Lain-lain : Nyatakan ( )	Tidak Setuju	Neutral	Setuju

F. ULASAN

G. CADANGAN PENAMBAHBAIKAN

JKR	**VALUE ENGINEERING** ***VE Study Pre Requiste***	Reference : JKR.VE.Pre.01 Page No : 1 Issue No : 1 Revision No : 1 Date : AUGUST 2013

PROJECT:	**RMK10/ RP :**
MINISTRY / CLIENT / EPU SECTION:	
HOPT:	
HODT: IN-HOUSE / CONSULTANT	

NO.	ITEMS	YES	NO	REMARKS
1	Reports on Value Assessment (VA) has been reviewed by HOPT / HODT (if VA implemented)	☐	☐	
2	Client Brief was submitted by Client	☐	☐	
3	Design Brief and SOA (Building) has been prepared	☐	☐	
4	Preliminary work has been carried out (eg Survey, SI, etc.)	☐	☐	
5	CONVENTIONAL			
	Buildings - Design Concept has been prepared and reviewed	☐	☐	
	Roads - Preliminary Design has been prepared and reviewed	☐	☐	
6	DESIGN & BUILD			
	Need Statement has been prepared and reviewed	☐	☐	
7	Preliminary cost estimates have been prepared and reviewed	☐	☐	
8	If the VA study has been done;			
	Compliance to the VA for the scope of the project and GFA (Building) * Specify the scope of the difference (if any)	☐	☐	
	Compliance to the VA for the provision of Project Cost (RM) * State the total variance (RM) (if any), and * State the percentage of variance (%) (if any)	☐	☐	RM: %:
	Note: The scope/ cost of the project should be reviewed if different/ more than the cost determined by VA			
9	Tender date has been set; indicate the date	☐	☐	Date:
10	Others:			

REMARKS:

1. Readiness to implement VE Lab: READY / NOT READY
2. Proposed date of VE Lab:_

REVIEWED BY:	**DATE:**

JKR	**VALUE ENGINEERING** ***VE Study Pre Lab Checklist***	Reference : JKR.VE.Pre.02 Page No : 1/4 Issue No : 1 Revision No : 1 Date : AUGUST 2013

PROJECT:	
HOPT:	**DATE:**

NO.	ITEMS	LIST	RESPONSIBILITY	REMARKS
1.	Obtain approval from Project Management Plan (PMP)	☐	Facilitator	
2.	Propose suggestions, discuss and get Client / HOPT consent:	☐		
2a.	VE Pre Lab meeting - date, place, time, etc.	☐	HOPT / Facilitator	
2b.	VE Study Objectives	☐	Facilitator	
2c.	VE Lab duration and tentative agenda (if any)	☐	Facilitator	
2d.	Date / Venue / Cost of VE Lab	☐	Client / HOPT	
2e.	VE Lab participants	☐	HOPT / Facilitator	
2f.	Level and Scope of VE Study	☐	Facilitator	
2g.	Feasibility of VE findings	☐	Facilitator	
2h.	Requirements for further VE Lab (VE II)	☐	Facilitator	
2i.	Identify issues / implications / constraints	☐	Client / HOPT / Facilitator	
2j.	Others:	☐		
3.	Collate Information / Documents / Drawings:	☐		
3a	Value Assessment Report (VA) (if any)	☐	Client / Facilitator	
3b	Total Budget & Ceiling Approved	☐	Client / HOPT	
3c	Approved Project Brief (Latest)	☐	Client / HOPT	
3d	Schedule of Accommodation (SOA) – Building Project	☐	Client / HOPT	
3e	Statistical data and user requirements	☐	Client / HOPT	
3f	Concept Design Drawings (Latest)	☐	HOPT / HODT	
3g	Bills of Quantities / Price Summary (if any)	☐	HOPT / HODT	
3h	Specification	☐	HOPT / HODT	
3i	Identify Local Authority requirements	☐	HOPT/HODT	
3j	Preliminary Detailed Abstract (PDA) (Latest)	☐	HOPT	
3k	Estimation Cost (If any)	☐	HOPT / HODT (QS)	

JKR	**VALUE ENGINEERING** ***VE Study Pre Lab Checklist***	Reference : JKR.VE.Pre.02 Page No : 2/4 Issue No : 1 Revision No : 1 Date : AUGUST 2013

NO.	ITEMS	LIST	RESPONSIBILITY	REMARKS
3l	Work Program Schedule (Latest)	☐	HOPT	
3m	Risk Management Plan (If any)	☐	HOPT	
3n	Others:	☐		
4	Site visit (if necessary)	☐	HOPT / Facilitator	
5	Initial Study and Proposal:	☐		
5a	Project Objectives	☐	Facilitator	
5b	Client Value System (CVS)	☐	Facilitator / Client	
5c	Cost Model	☐	Facilitator / HODT (QS)	
5d	Project Functions	☐	Facilitator	
5e	Others:	☐		
6	Lab Preparation and Logistic:	☐		
6a	Prepare Lab Agenda	☐	Facilitator	
6b	Appoint Facilitator Team	☐	Facilitator	
6c	Identify Lab Participants	☐	HOPT / Facilitator	
6d	Circulate Invitation letter	☐	HOPT	
6e	Form working groups dan set scope of work	☐	Facilitator	
6f	Set-up Lab Arrangement and Logistic; Refer to VE Lab Requirement List Refer to VE Lab Furniture Layout	☐	Client / HOPT / Facilitator	
6g	Prepare Lab Kit	☐	Facilitator	
6h	Prepare for stationery / tools / ICT equipment	☐	HOPT / Facilitator	
6i	Others:	☐		
7	Pre Lab Orientation Session (If necessary)	☐		
7a	VE Pre Lab Meeting / Briefing to Facilitator	☐	Facilitator	
7b	VE Pre Lab Meeting / Briefing to Participants	☐	Facilitator	
7c	Others:	☐		

JKR	**VALUE ENGINEERING** ***VE Study Pre Lab Checklist***	Reference : JKR.VE.Pre.02 Page No : 3/4 Issue No : 1 Revision No : 1 Date : AUGUST 2013

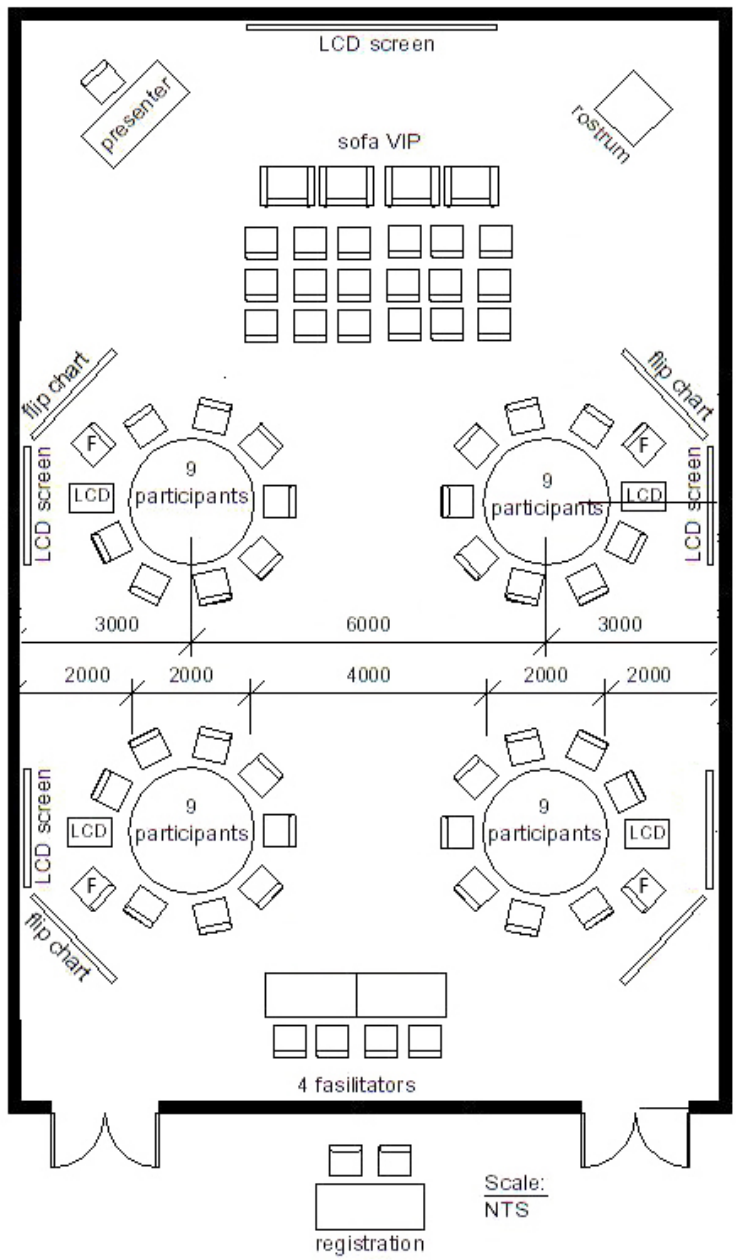
REVIEWED BY:	**DATE:**

VE LAB REQUIREMENT LIST

NO.	REQUIRED ITEM	LIST	QUANTITY	REMARKS
1	Printer	☐		
2	Flip chart (1 set for each group)	☐		
3	Marker Pen (3 types of colour for each group)	☐		
4	Whiteboard Eraser (1 no. for each group)	☐		
5	Round Table (large size) with 8-9 seats (one set for each group)	☐		
6	Microphone and sound system (Wireless / dynamic)	☐		
7	LCD Projector (one set for each group)	☐		
8	Laptop (one set for each group)	☐		
9	Screen Projector complete with Tables (one set for each group)	☐		
10	Registration table complete with 2 no. of chairs	☐		
11	Rostrum for opening / sign off ceremony	☐		If required
12	Table and chair for Facilitator	☐		
13	Sofa for VIP (for opening / sign-off only)	☐		
14	Extension Cable for Electricity Socket	☐		Proper Cable Management

JKR	**VALUE ENGINEERING** ***VE Study Pre Lab Checklist***	Reference : JKR.VE.Pre.02 Page No : 4/4 Issue No : 1 Revision No : 1 Date : AUGUST 2013

VE LAB FURNITURE LAYOUT



JKR	**VALUE ENGINEERING** ***VE Lab Participant (A.C.I.D Test)***	Reference : JKR.VE.Pre.03 Page No : 1 Issue No : 1 Revision No : 1 Date : AUGUST 2013

PROJECT	**:**
HOPT	**:**
AGENCY / MINISTRY / CLIENT	**:**

A - "AUTHORISE"	Entities with executive authority to take decisions or resolve issues in lab
C - "CONSULT"	Experts who have to be consulted on particular aspects during lab
I - "INFORM"	Entities who have to be informed on lab decisions (not to participate)
D - "DO"	Entities who have to carry out major tasks of lab recommendations

NO.	ENTITY	DEPARTMENT / POSITION	PLEASE TICK (√)				REMARKS
			A	C	I	D	

EXAMPLE OF REMARKS:
ROLES / ATTENDANCE FOR A PARTICULAR SESSION / NUMBER OF PARTICIPANTS NEEDED

JKR	**VALUE ENGINEERING** ***List of Group Participants***	Reference : JKR.VE.Lab.01 Page No : 1 Issue No : 1 Revision No : 1 Date : AUGUST 2013

PROJECT :
GROUP :

NO	NAME	POSITION	COMPANY	TELEPHONE / EMAIL
TEAM LEADER				
1				
TEAM MEMBERS				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
FACILITATOR				
1				
2				

	VALUE ENGINEERING ***Information Phase***	Reference : JKR.VE.Lab.02 Page No : 1 Issue No : 2 Revision No : 02 Date : AUGUST 2015

PROJECT :	**GROUP :**
LEVEL : PROJECT / SPACE/ ELEMENT / COMPONENT	**PAGE :**
SCOPE :	**DATE :**

NO.	PARAMETERS / ISSUES ADDRESSED	REMARKS

JKR	**VALUE ENGINEERING** ***Function Analysis Phase (Sheet 1)***	Reference : JKR.VE.Lab.03a Page No : 1 Issue No : 2 Revision No : 02 Date : AUGUST 2015

PROJECT :	**GROUP :**
LEVEL : PROJECT/ SPACE/ELEMENT/ COMPONENT	**PAGE :**
SCOPE :	**DATE :**

NO.	SCOPE DESCRIPTION	FUNCTION			AREA (M^2)	USER CAPACITY	REMARKS
		VERB	NOUN	TYPE	COST (RM)	SPECIFICATION	

Notes:

Function - Type:
- **B** - BASIC FUNCTION
- **S** - SECONDARY FUNCTION
- **RS** - REQUIRED SECONDARY FUNCTION

JKR	**VALUE ENGINEERING** ***Function Analysis Phase (Sheet 2)***	Reference : JKR.VE.Lab.03b Page No : 1 Issue No : 2 Revision No : 02 Date : AUGUST 2015

PROJECT :	**GROUP :**
LEVEL : PROJECT/ SPACE/ELEMENT/ COMPONENT	**PAGE :**
SCOPE :	**DATE :**

NO.	SCOPE DESCRIPTION	USER	USER FLOW / OPERATIONAL PROCESS	REMARKS
		SPACE ADJACENCY		**REMARKS**

JKR	**VALUE ENGINEERING** ***Creative Phase & Evaluation Phase***	Reference : JKR.VE.Lab.04 Page No : 1 Issue No : 2 Revision No : 02 Date : AUGUST 2015

PROJECT :	**GROUP :**
LEVEL : PROJECT/ SPACE/ELEMENT/ COMPONENT	**PAGE : 1/**
SCOPE :	**DATE :**

NO.	CREATIVE PHASE	EVALUATION PHASE					
	GENERATED IDEAS	CLIENT ACCEPTABILITY	FUNCTIONAL SUITABILITY	TECHNICAL FEASIBILITY	ECONOMICAL FEASIBILITY	(E) - EVALUATE (I) - INFORMATION (D) - DISCARD	**REMARKS**

JKR	**VALUE ENGINEERING** ***Development Phase***	Reference : JKR.VE.Lab.05 Page No : 1 Issue No : 2 Revision No : 02 Date : AUGUST 2015

PROJECT :		**GROUP :**	**RECOMMENDATION BOX:** **YES / NO** **RECOMMENDATION IDEA NO:**
EVALUATED IDEA NO :		**PAGE :**	
		DATE :	
EXISTING DESIGN / SKETCH		**COST BREAKDOWN**	
EVALUATED IDEA / SKETCH		**COST BREAKDOWN**	
ADVANTAGES / INNOVATION	**DISADVANTAGES / RISK**	**COST IMPLICATION**	
		ORIGINAL DESIGN COST (RM)	0.00
		EVALUATED IDEA COST (RM)	0.00
		COST SAVING (RM); EXTRA COST (RM);	0.00

JKR	VALUE ENGINEERING *Summary Of Recommendation*	Reference : JKR.VE.Lab.06 Page No : 1 Issue No : 2 Revision No : 02 Date : AUGUST 2015

PROJECT :	**GROUP :**
LEVEL : PROJECT/ SPACE/ELEMENT/ COMPONENT	**PAGE : 1/**
SCOPE :	**DATE :**

NO	RECOMMEND	CATEGORY	IDEAS	SAVING / EXTRA (RM)

JKR	**VALUE ENGINEERING** ***VE Post Lab Action Plan Report***	Reference : JKR.VE.Post.01 Page No : 1 Issue No : 1 Revision No : 01 Date : AUGUST 2013

PROJECT :	
VENUE / (VE LAB):	**DATE (VE LAB):**

NO.	AGREED ACTION PLAN	OUTPUT	RESPONSIBILITY	TARGET COMPLETION DATE	ACTUAL COMPLETION DATE	STATUS	REMARKS

PREPARED BY:	**DATE:**	**SIGNATURE:**

JKR	**VALUE ENGINEERING** ***VE Post Lab Compliance Report***	Reference : JKR.VE.Post.02 Page No : 1 Issue No : 1 Revision No : 1 Date : AUGUST 2013

PROJECT :	
VENUE / (VE LAB):	**DATE (VE LAB):**

NO.	RECOMMENDED IDEAS	SAVINGS / EXTRA	COMPLIANCE			REMARKS
			YES	PARTIAL	NO	

PREPARED BY:	**DATE:**	**SIGNATURE:**
PREPARED BY:	**DATE:**	**SIGNATURE:**

DESIGNED BY MEDIAKENTAL 019 377 5044

Cawangan Perancangan Aset Bersepadu
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