



Rethinking Sustainable Infrastructure - using Innovation tools

Key Objectives

1. Capture ideas
2. Extend our thinking
3. Integrate innovation and sustainable outcomes into BAU

➡ 'Getting the best results'

‘Cloud 9 File’

An opportunity register that captures problems, ideas and opportunities throughout the project process;

- Ideas that can be applied to other projects
- Lessons learnt
- Constructive comments and information

Innovation Training

1. Innovation and Teamwork
2. Identifying Problems and Opportunities
3. Generating Ideas
4. Selecting and Assessing Ideas

Innovation Tools

Built innovation tools into project management processes to make it part of BAU

- Identify the stages
- Select the most user friendly tools
- Develop and adapt the innovation tools

Wastewater Network Strategic Improvement Project



A starting point for innovation tools

- Understanding the core work
- Clearly defined approach to projects
- Structured and templated project processes
- Sustainable outcomes required by LGA

CONCEPT DESIGN - Process Guide



SCAMPER

S	Substitute
C	Combine
A	Adapt
M	Modify
P	Put to other uses
E	Eliminate
R	Rearrange

- Divergent Thinking Tool – used for generating and spurring ideas

What materials can we use?

What can be made more flexible?

What life span / sustainability do the materials and or technology have?

What are the impacts of climate change?

What technologies can we use or adapt?

What resources / technologies are we relying on?

**Substitute materials
or technology**

What other methods can we use? eg gravity, pumped, stored

What combinations of methods can we use?

Can we change the sequence / order of implementation?

What ideas / options can be combined?

Can we create other extensions?

What can we condense, leave out, reduce?

What can we make; lower, higher, shorter, larger, more cost effective, more time effective?

Combine options

Rearrange layouts

**Adapt, modify,
magnify solutions**

Can we increase the time?

Can we increase the volume?

Can we reduce the load?

Can we change the sequence / order of the flow?

Can we change the timing of the peaks?

Can we cope with low flows?

Where else could we send the flow?

Can we reduce corrosion / odour?

modify, magnify flows

Rearrange flows

Eliminate, flows

Can we change the pace or time?

Can we change the schedule?

How else can it benefit the community?

What else does the community want / need in this catchment?

Can this resource have a combined use? eg building design

Can we make it less disruptive to the community, culture, Society?

How can we use this in other projects? eg Lessons Learned

Who else has a project in this catchment that we can involve?

Modify programme

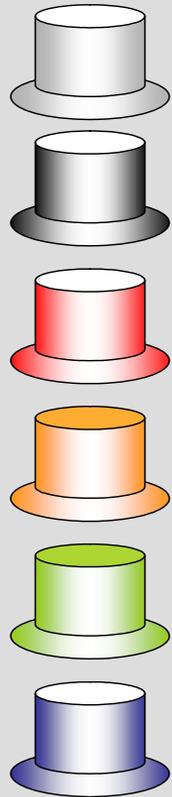
Put to other uses

Combine projects

Concept Design

Generate Concepts Guide

SIX HATS



Information, facts

Devils advocate

Intuition, feelings

Benefits

Creativity

Strategy, big picture

- Convergent Thinking Tool – used for assessing and developing ideas

What additional information do we need?
What questions need to be answered?
What is missing; more information, data, checking assumptions?
What tests do we need to carry out?
What budgets are available in OPEX and CAPEX?
What resource consents do we need?
What landowner consents do we need?
How easy is it to build?
Can we operate and maintain it safely?

1

What is the downside of each option?
Who will oppose this option/solution: stakeholders; client, public, resident, contractor etc.
What are the risks associated with each option?
Why will this option not work now?
Why will this option not work in the future?
What are the environmental and cultural impacts?
How much disruption will it cause?

3

What does everyone think and feel about the options?
What is your gut intuition?
Are we in agreement - have we got the 'right' option?

5

What is valuable about the option?
Where is the value?
Who will support this option/solution; stakeholders; client, public, resident, contractor etc.
What benefits does it have for NSCC?
What benefits does it have for the community?
Does it meet NSCC's objectives?

2

How can we improve the option or do it in a different way?
How can we combine options; make it easier, more cost effective, less disruptive?
How can we increase the success of the project?
What else is possible?
How can we change the options to mitigate the risks?
Have we made the right assumptions?
Have we brought in the right stakeholders?

4

What are the next planning steps? e.g meeting minutes, memo, reports, additional data, information, testing
How do we make this happen?
Who is doing what?
Are we solving the initial problem?

6

Evaluate Options Guide



Concept design option identification



- Substitute
- Combine
- Adapt
- Modify
- Put to other uses
- Eliminate
- Rearrange

Measuring the outcomes & results

- Site visits useful to communicate constraints
- Important to gather different stakeholder views early
- Stakeholder engagement
- Opportunities and synergies

Detailed design & construction innovation

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Problem Evaluation Guide

Step 1	Please state the problem
Step 2	To get to the root cause of a problem quickly, ask 'why' x 5 (see example below)

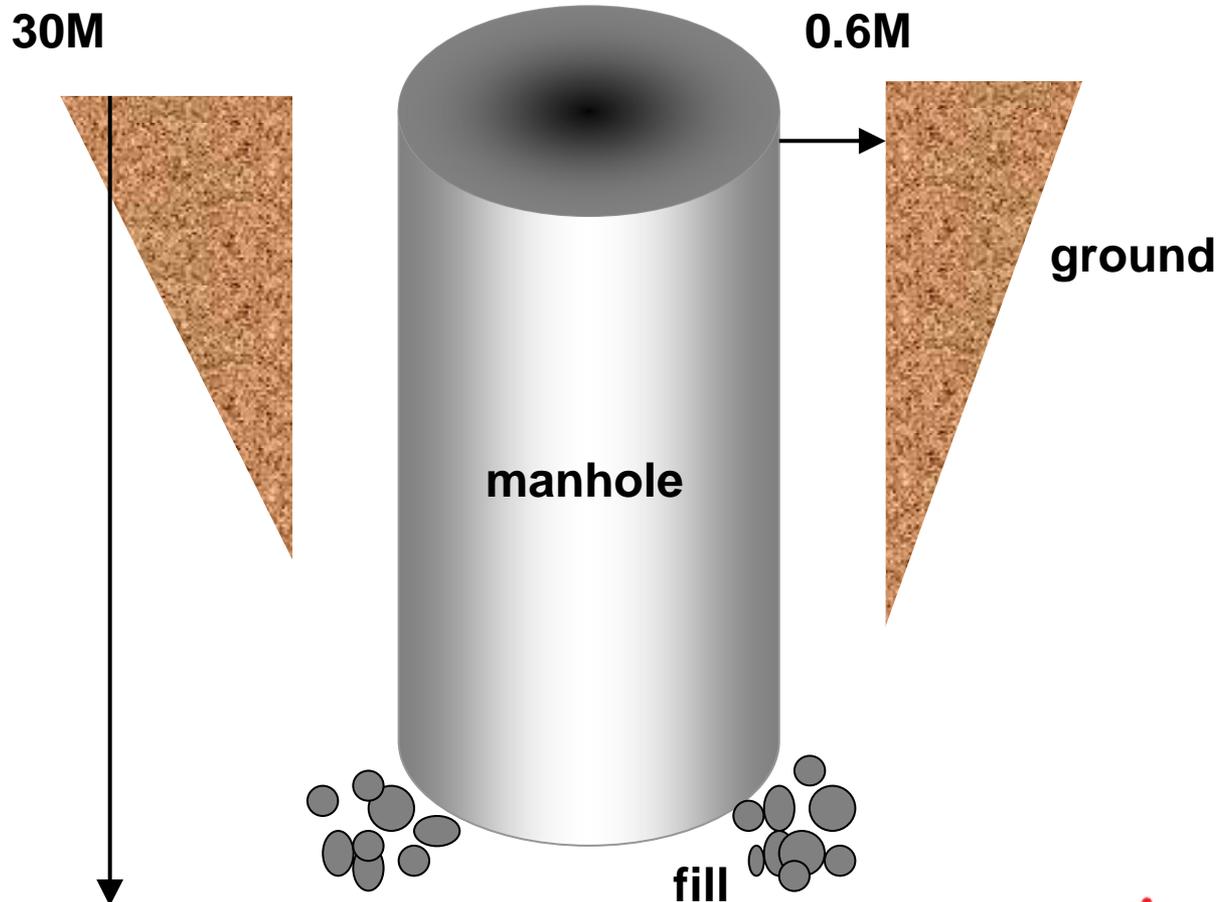
<i>Example:</i>	
<i>Problem: 1000 tonnes of water is seeping into the pipe system every 4 hours.</i>	
<i>Why is this happening?</i>	
<i>Because there are faults in the pipe</i>	
<i>Ok, Why?</i>	
<i>Because the pipe has deteriorated with time</i>	
<i>Ok, Why?</i>	
<i>Because the fault has not been identified and the pipe has not been repaired /maintained</i>	
<i>Ok, Why?</i>	
<i>Because the significance of the problem has not been realised</i>	
<i>Ok, Why?</i>	
<i>Because regular flow monitoring/pipe inspection is not carried out</i>	

Step 3	Now we understand the causes of the problem please state the 'real' problem.
Step 4	Then restate the problem by starting a sentence with; How can we.....by using an action verb, object and subject in the sentence.

<i>Example:</i>	
<i>Real Problem: Regular flow monitoring/pipe inspection is not carried out</i>	
<i>How can we... <u>monitor</u> (action verb) the <u>pipeline condition</u> (object) to enable timely repair of <u>sewers</u> (subject)?</i>	

Step 5	Generate and discuss ideas that will overcome this problem. You may choose to use the Idea Development Resource Kit to assist you with this process.
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Construction innovation example



Summary

- Innovation and sustainable outcomes are linked
- Innovation tools can be incorporated into project processes
- Innovation tools can be useful at the delivery end, as well as the options stage
- Developing the tools has made a number of smaller improvements to the processes

By integrating innovation tools and resources into BAU we were able to solve problems more efficiently, save time, improve outcomes and drive tangible cost savings in projects.



Questions?...