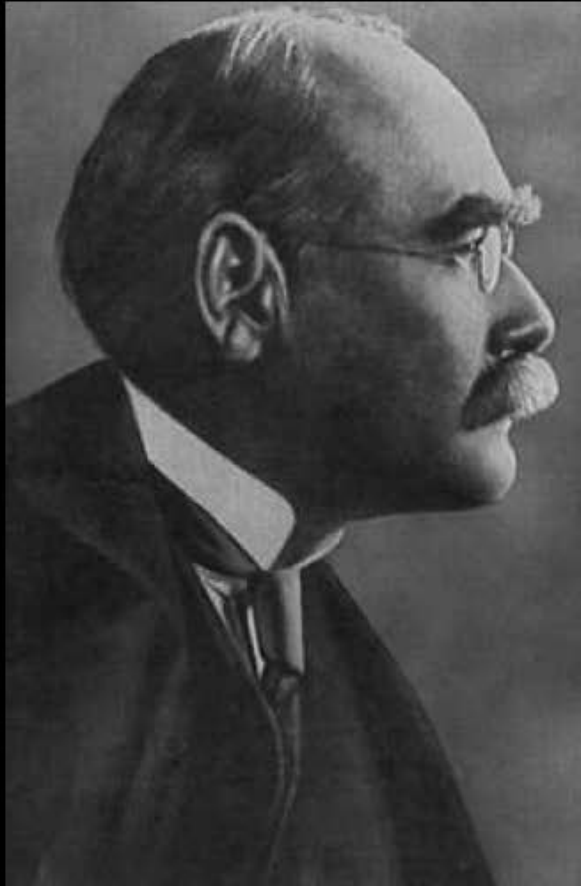


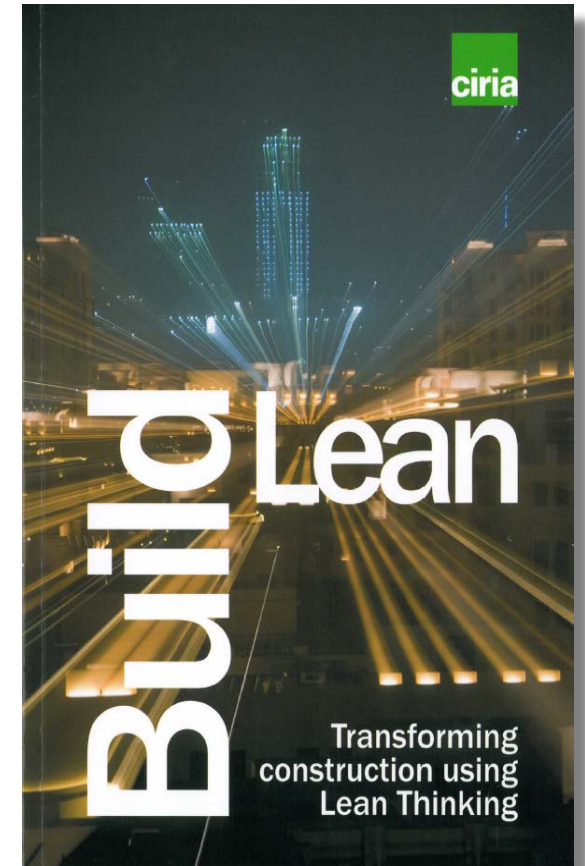
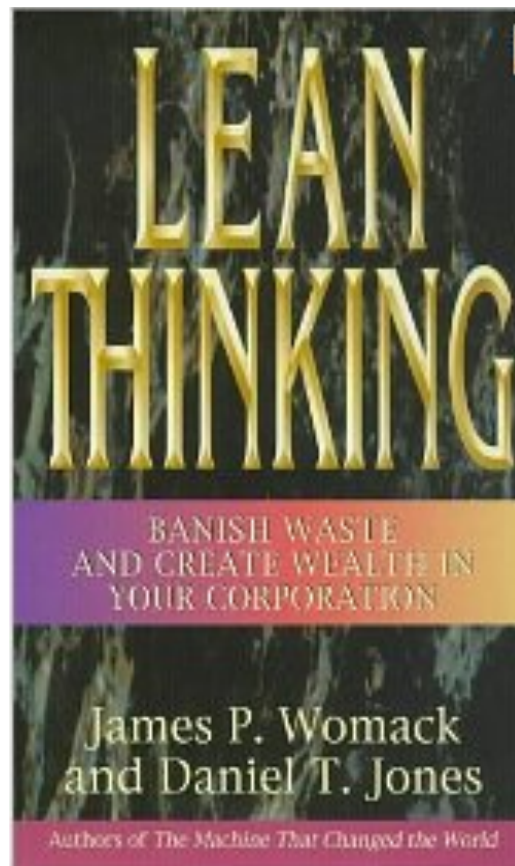
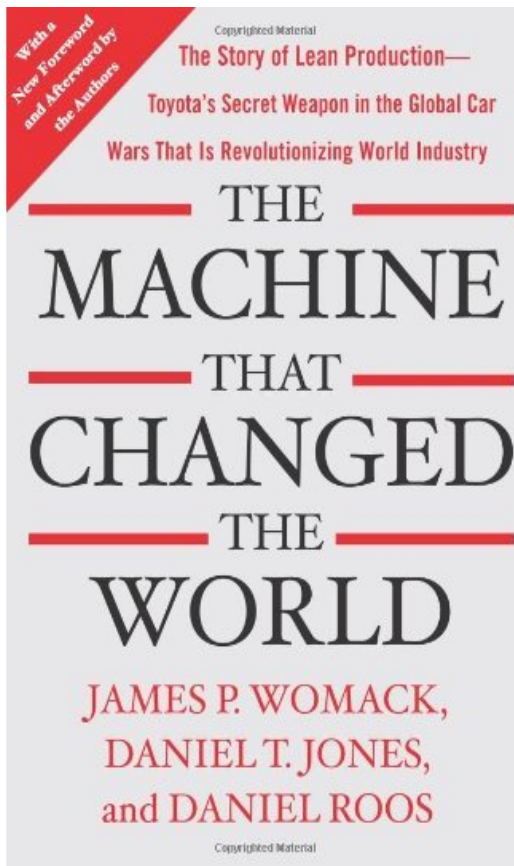
# Deploying Lean Construction across a £3bn supply chain

**Derek Drysdale -Divisional Director  
Lean Improvement  
Highways Agency UK**



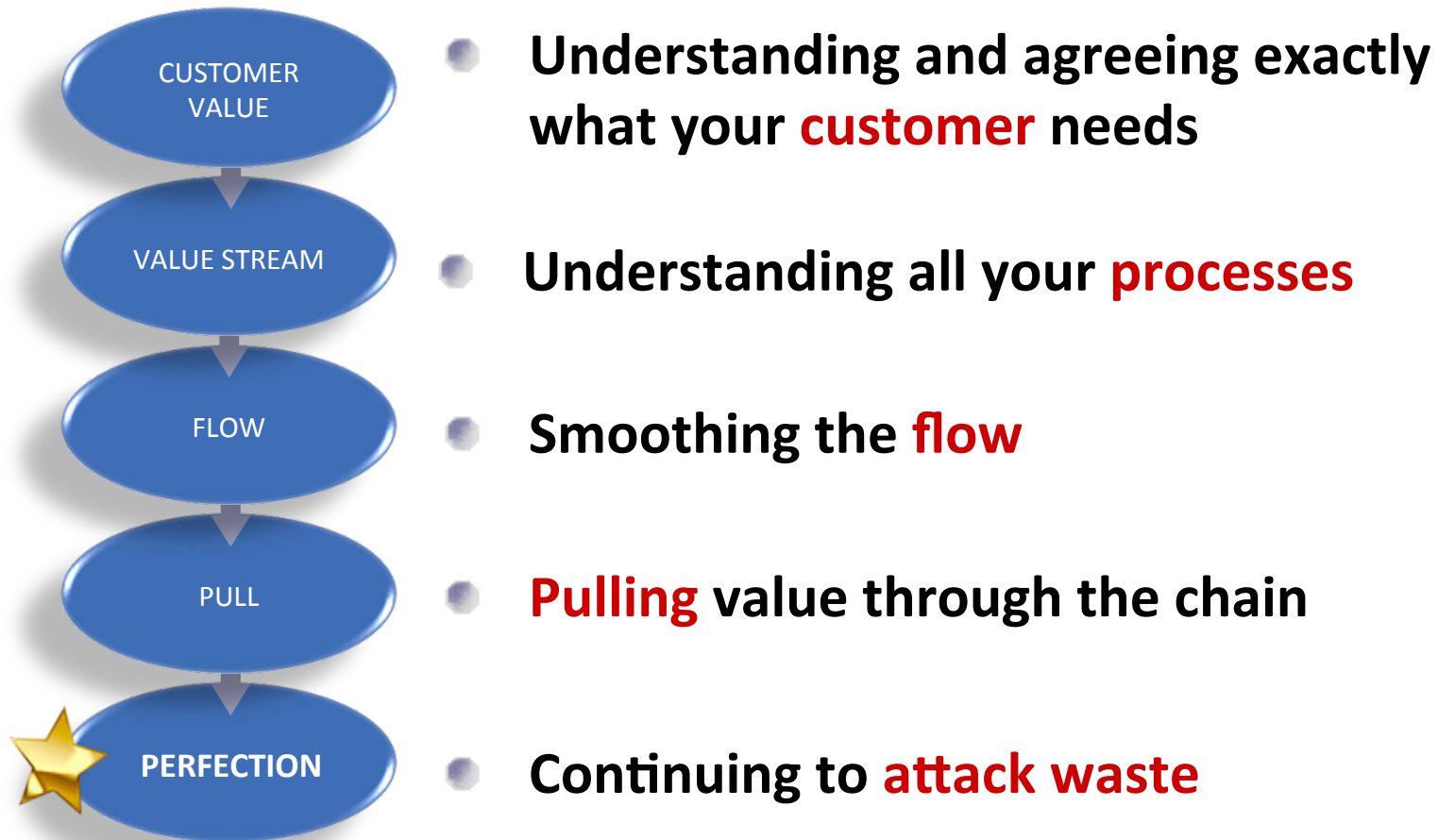
*I tell this tale,  
which is strictly true,  
Just by way of convincing you  
How very little,  
since things were made,  
Things have altered  
in the building trade*

**Rudyard Kipling**



**The Client must engage with the Supply Chain to achieve continuous improvement!**

# Defining Lean Thinking?



Principles now adopted world-wide in a variety of industries and professions



# What is Waste?



# Its about people!



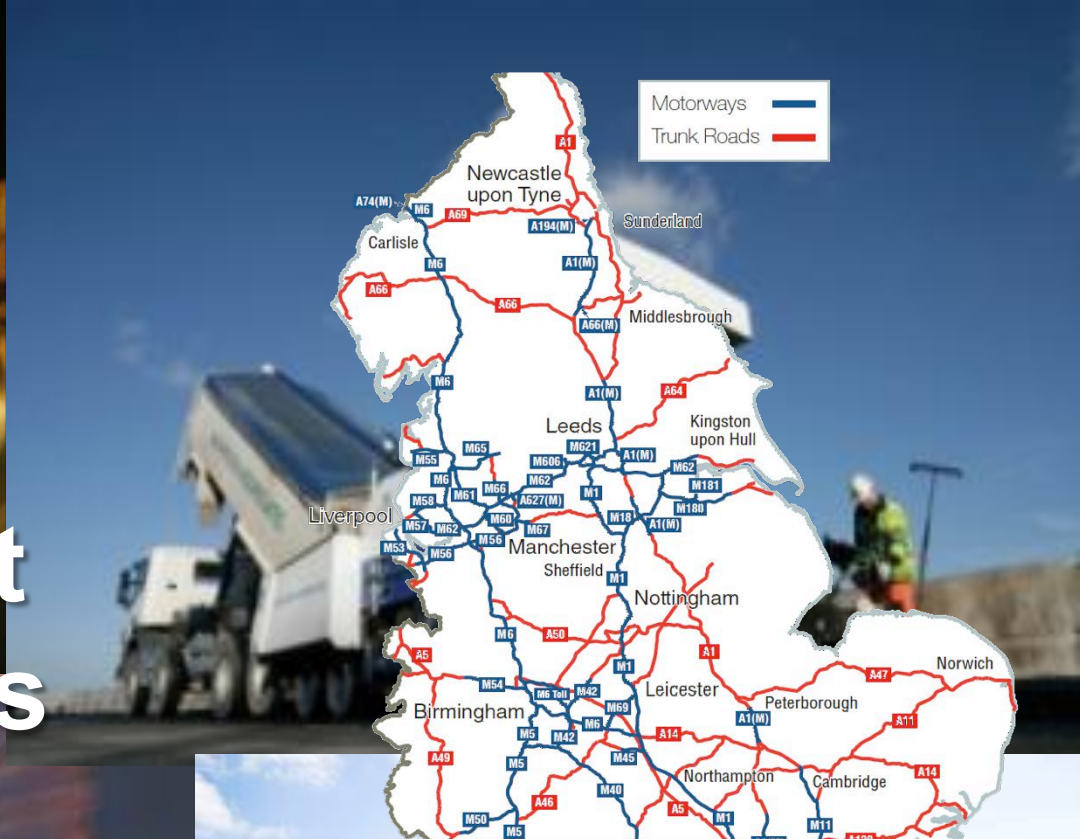


# SMART Motorways





**3500 Staff**  
**£2.5 bn annual**  
**20 – 30% Budget**  
**reduction targets**



**£100m Efficiencies to date**





**Major Projects**



**SMART  
Motorways**



# Highways Agency Lean Deployment

**Maintenance**



**HA Processes**

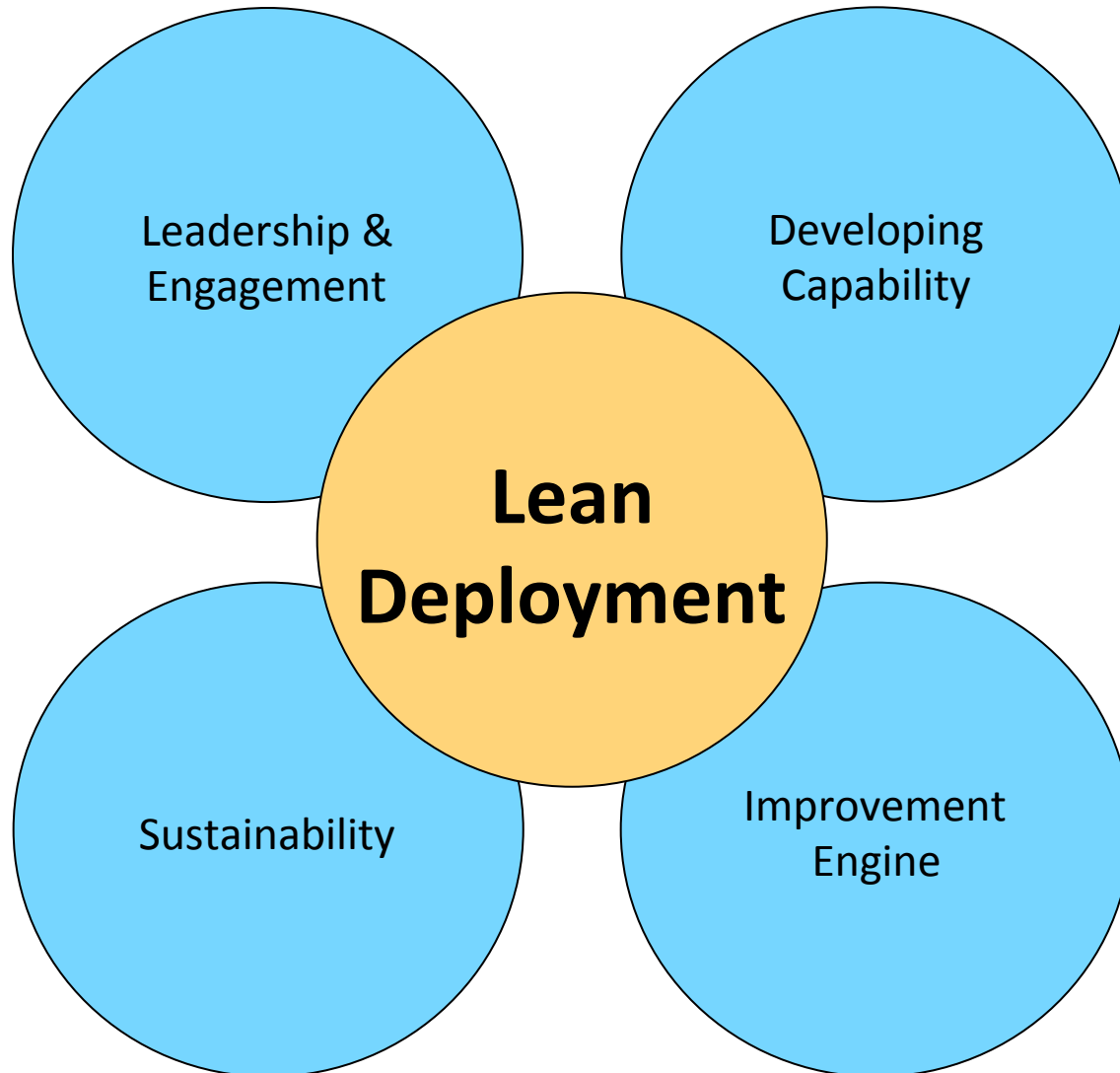


# Creating the right Environment

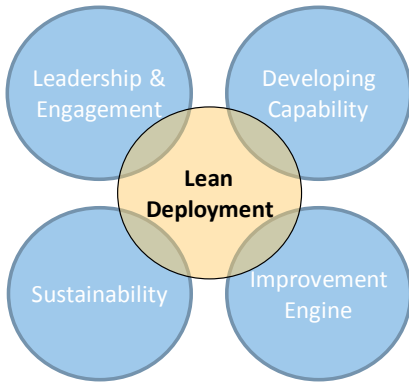
- Contractual incentives – ‘traditional or adversarial’ contracts don’t work!
- Develop relationships which are collaborative
- Strive to become an “Intelligent Client”
  - Engage with all levels of the supply chain
  - Understand the cost base
  - Measure Performance
  - **Rewards which incentivise continuous improvement**



# Lean Deployment Strategy



# The House of Lean Construction



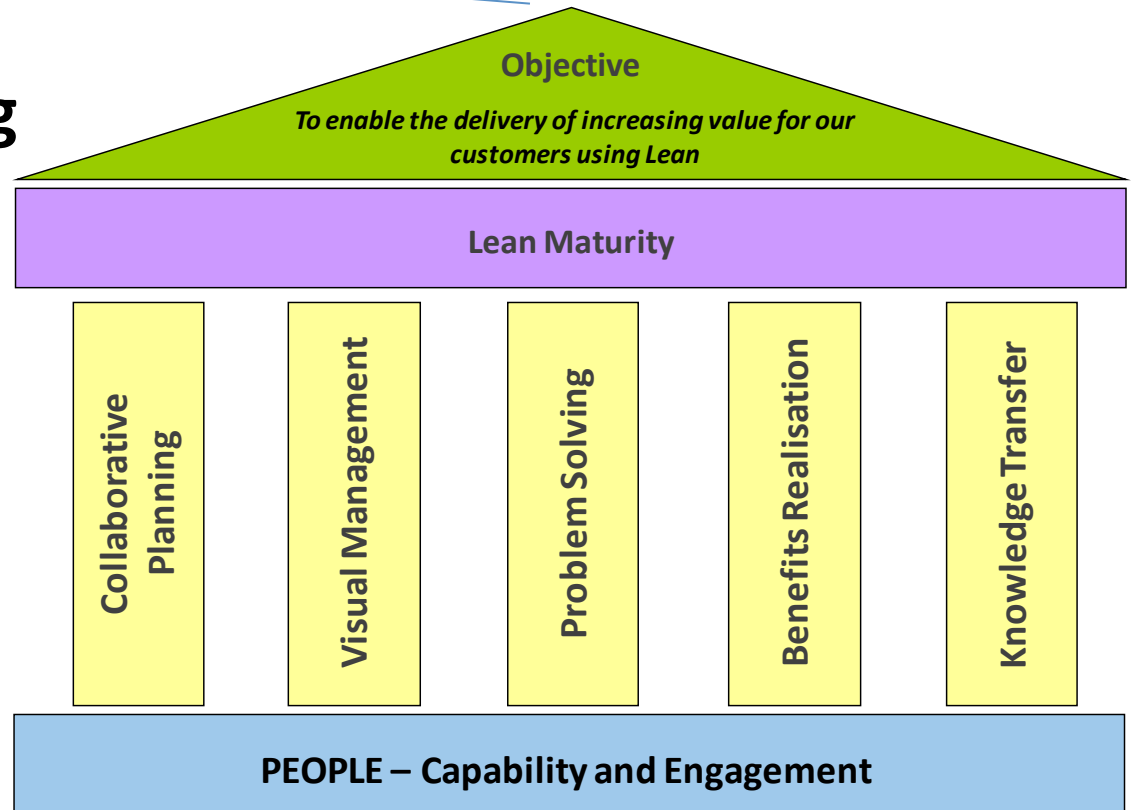
**Collaborative Planning**

**Visual Management**

**Problem Solving**

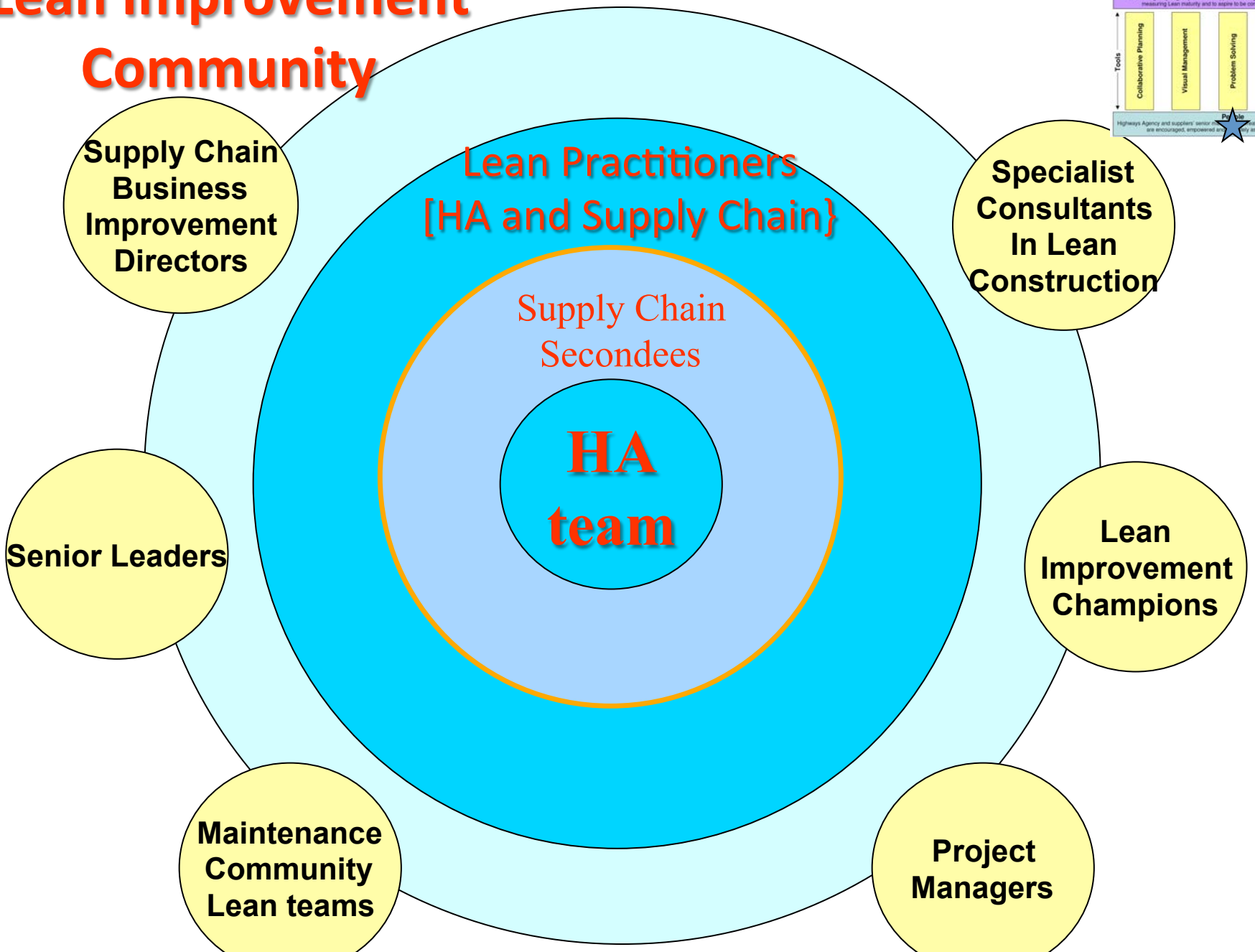
**Benefits Realisation**

**Knowledge Transfer**





# Lean Improvement Community



**Objectives**  
HA Supply Chain to have a self-sustaining continuous improvement culture

**Assessment of Lean Maturity**  
For the Highway Agency and their suppliers to recognise HLMAT as the main tool for measuring Lean maturity and to agree to be continually improving their score

**Tools**

- Collaborative Planning
- Visual Management
- Problem Solving
- Benefits Realisation
- Knowledge Transfer

**People**  
Highways Agency and supplier senior executives create an environment in which their people are encouraged, empowered and supported to continually improve

# Highways Agency Development Route Map

A multiple stage approach to meet individual development needs

## Basic Lean Awareness

1 day – 1 module

- Experience of Lean using practical exercises
- insight into how Lean thinking can be applied to your own processes
- To describe the Agency's approach to Lean Deployment
- Understand Lean principles and some of the basic tools

## Lean Foundation

3 days – 1 module

- Understand concepts and language of lean
- Deliver simple projects with initial support
- Understand lean philosophy
- Start to challenge waste
- Receive attainment certificate on passing test at end of module

## Lean Practitioner

6 days – 2 modules

- Understand concepts
- Able to use a range of lean tools
- Understand the DMAICT approach, Collaborative Planning and Visual Management
- Able to lead Lean Projects
- Apply learning on own project during the training
- Receive attendance certificate
- Receive certificate of competence on completion of project

## Lean Sigma Green Belt

4 days – 1 module

- Understand concepts Able to use a range of Lean Sigma data analysis tools
- Able to lead more complex Projects
- Able to train to Lean Practitioner level
- Apply learning on delegates own HA project Green Belt 'accreditation' by Black Belt following pass of examination, completion of GB project & production of Knowledge Transfer Pack

## Lean Sigma Black Belt

4 days – 1 module

- Understand concepts . Able to use the full range of Lean Sigma tools – including data analysis.
- Able to lead complex Lean and Six Sigma Projects
- Have the foundations to train to Green Belt Black Belt 'accreditation' by Master Black Belt following pass of examination, completion of Black Belt project production of Knowledge Transfer Pack and review with Master Black Belt



# Lean Philosophy

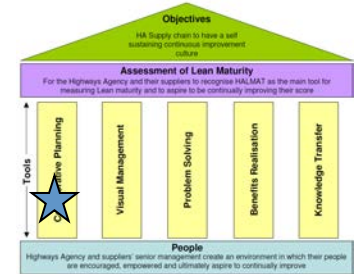
Paradoxically, we have discovered that the actual plans emerging from our policy deployment exercises are only good for 3 months.....

A value creation system must be flexible and responsive because forecasts always go wrong.....

..... We realized that policy deployment plan is nothing more than an organizational forecast, which future events quickly conspire to go wrong.

The objective of < value stream mapping > ..... is to raise the shared consciousness along a given value stream about the performance of the whole stream, the cause of waste and best approaches to Improvement.....

# Collaborative Planning



Safe roads, Reliable journeys, Informed travellers

**HIGHWAYS AGENCY**

## Lean Improvement Division

An Introduction to the Collaborative Planning System

An Introduction to the Collaborative Planning System

**Information**

At Her Majesty's Stationery Office  
 Transport

## The Collaborative Planning System

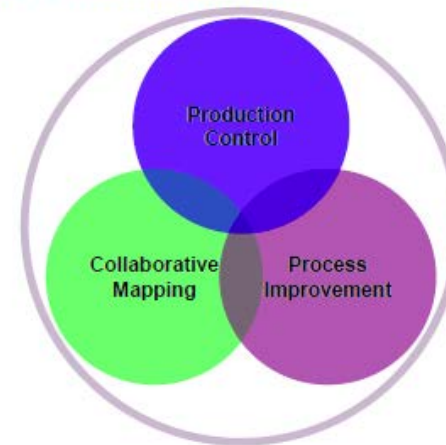
### What is the Collaborative Planning System?

The Collaborative Planning System is about enabling teams to deliver the same amount of work but with less resource. It involves doing three things:

- **Production Control** - Enabling better productivity through effective resource and information management
- **Collaborative Mapping** - Enabling better planning through the creation of process-based lookahead programmes
- **Seeking continuous Process Improvement** through the implementation and adoption of continuous improvement tools

The adoption of the above techniques has been proven to generate rapid improvement in team performance.

Figure 1 The Collaborative Planning System



Page 5

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# Continuous Improvement Cells

## Project visualisation boards



## Weekly review meetings



Monthly KPI updates

Issue, Owners and Actions to Resolve

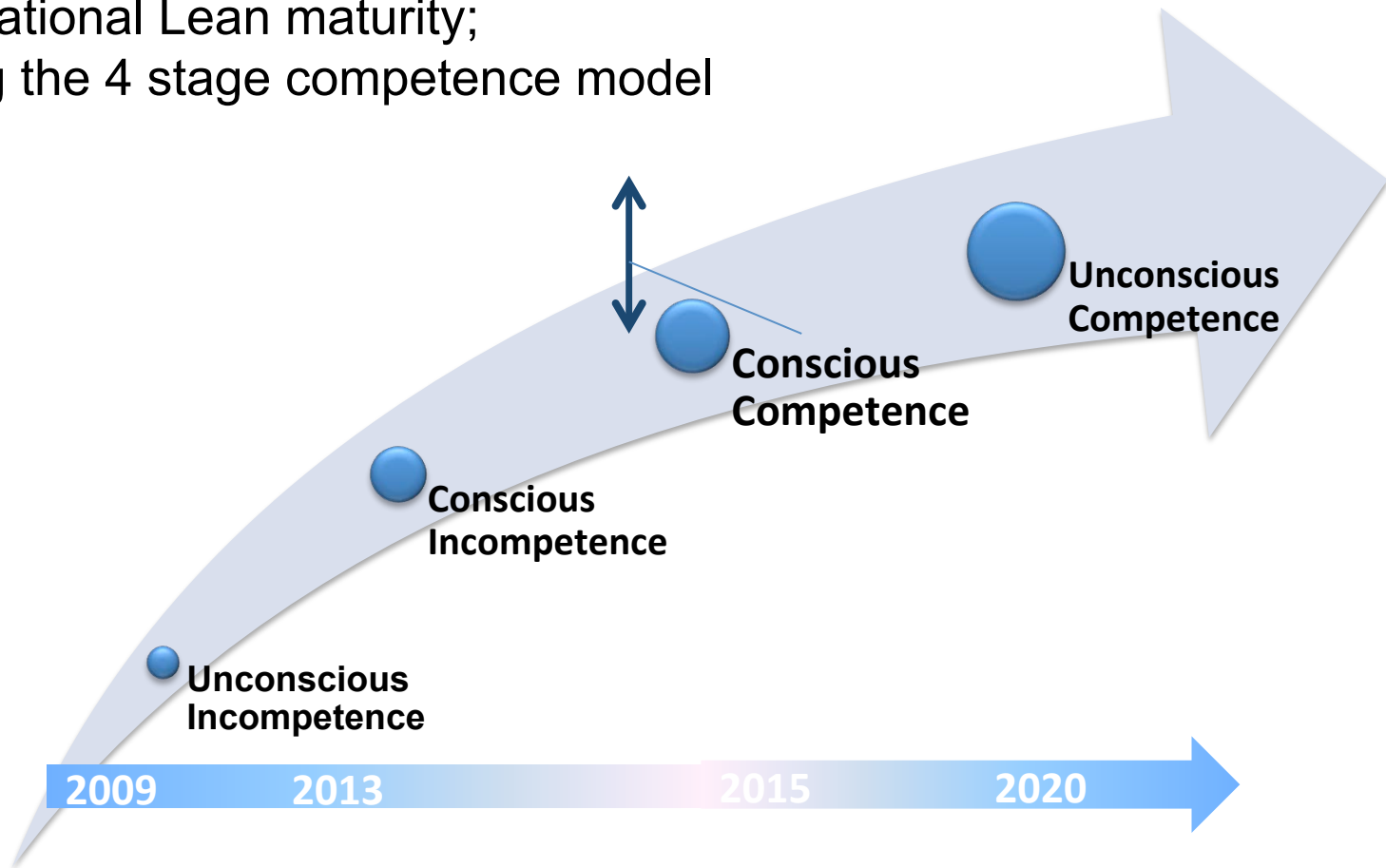
Poor Performance Areas to Improve

- Focus on:**
- Actions to resolve issues
  - Status and impact on forecasts
  - Lessons learnt sharing with peers
  - Escalating 'blockers' to obtain support/direction

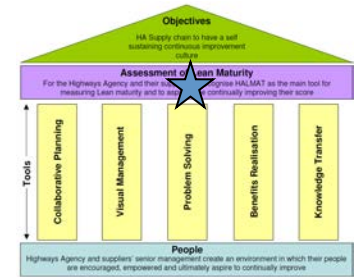
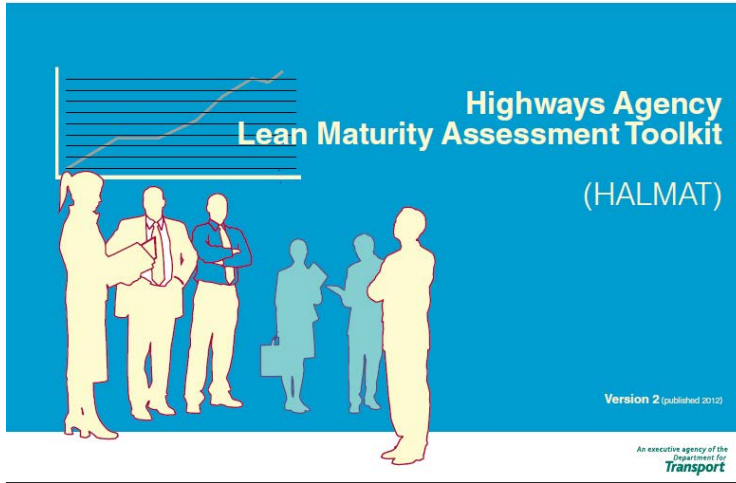
Inform **MONTHLY UPDATES**

# The route map to a Lean Highways Agency and our Supply Chain

Organisational Lean maturity;  
applying the 4 stage competence model







- 0 = Lean not yet introduced**
- 1 = Improvement in patches of the organisation**
- 2 = Lean is aligned to organisational strategy**
- 3 = Organisation plus supply chain engaged in Lean**
- 4 = Organisation is very mature and striving towards perfection**



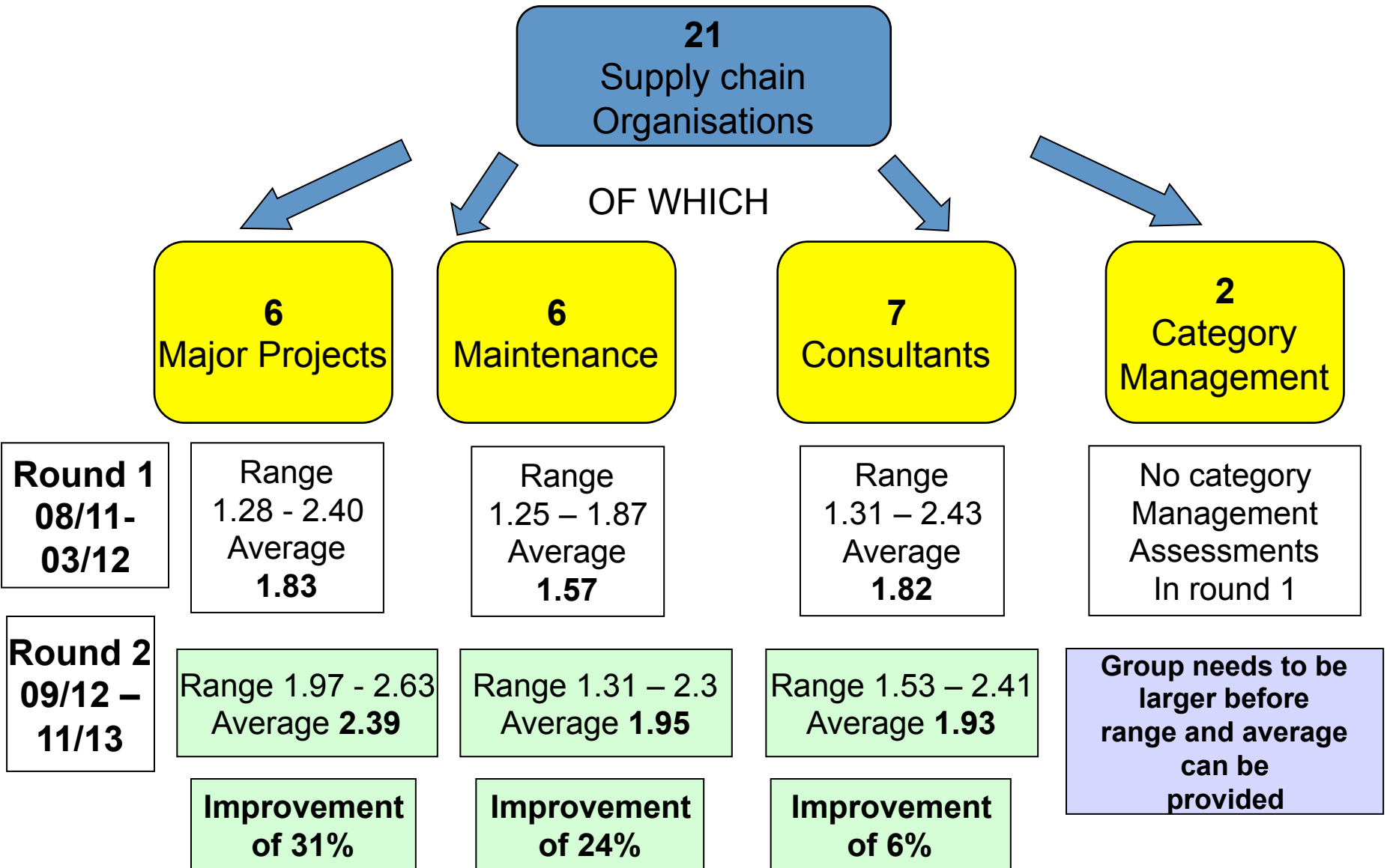
# Supply Chain Assessment Toolkit

This is an item within the Agency's performance monitoring tool, the 'Motivating Success Toolkit', and used to identify which suppliers to engage with in future

## **HALMAT categories**

- 1. Strategic use of Lean**
- 2. Lean Leadership**
- 3. Delivering Customer/Client Value**
- 4. Lean Structure and Behaviour**
- 5. Process Flow**
- 6. Standard Work**
- 7. Process Control and Quality**
- 8. Planning, Design and Construction**
- 9. Maintenance (of plant and equipment)**
- 10. Supporting Infrastructure.**

From 2012 to 2013 the following organisations underwent the HALMAT process  
 (Highways Agency Lean Maturity Assessment Toolkit)



Month HALMAT was undertaken	Supplier type	Score from current round	Score from previous round	Improvement	% improvement since previous round	At least 10% improvement?
Oct 2012	Consultant	1.94	2.03	-0.09	-4.4%	NO
Dec 2012	MP	2.61	2.4	0.21	8.8%	NO
Jan 2013	MP	2.7	1.28	1.42	110.9%	YES
April 2013	MP	2.42	2.21	0.21	9.5%	NO
June 2013	Maintenance	2.3	1.73	0.57	32.9%	YES
June 2013	MP	2.8	2.18	0.62	28.4%	YES
June 2013	Maintenance	2.3	1.44	0.86	59.7%	YES
July 2013	Consultant	1.55	1.6	-0.05	-3.1%	NO
Aug 2013	Maintenance	1.43	1.25	0.18	14.4%	YES
Aug 2013	Consultant	2	1.88	0.12	6.4%	NO
Sept 2013	Maintenance	2.14	1.58	0.56	35.4%	YES
Nov 2013	MP	2.39	1.94	0.45	23.2%	YES
Nov 2013	Consultant	2.2	1.81	0.39	21.5%	YES
Jan 2014	Consultant	2.2	1.73	0.47	27.2%	YES
Feb 2014	Consultant	2.5	2.43	0.07	2.9%	NO
Feb 2014	Consultant	1.79	1.62	0.17	10.5%	YES
Feb 2014	Consultant	2.11	1.9	0.21	11.1%	YES
March 2014	MP	2.72	1.97	0.75	38.1%	YES

**List of Tier One suppliers who have undertaken more than one HALMAT moderation.**

**Of these 18 suppliers, 12 (i.e. 67% of the group) have shown an improvement of 10% or higher since the previous round.**



# Collaborative Delivery Framework CDF

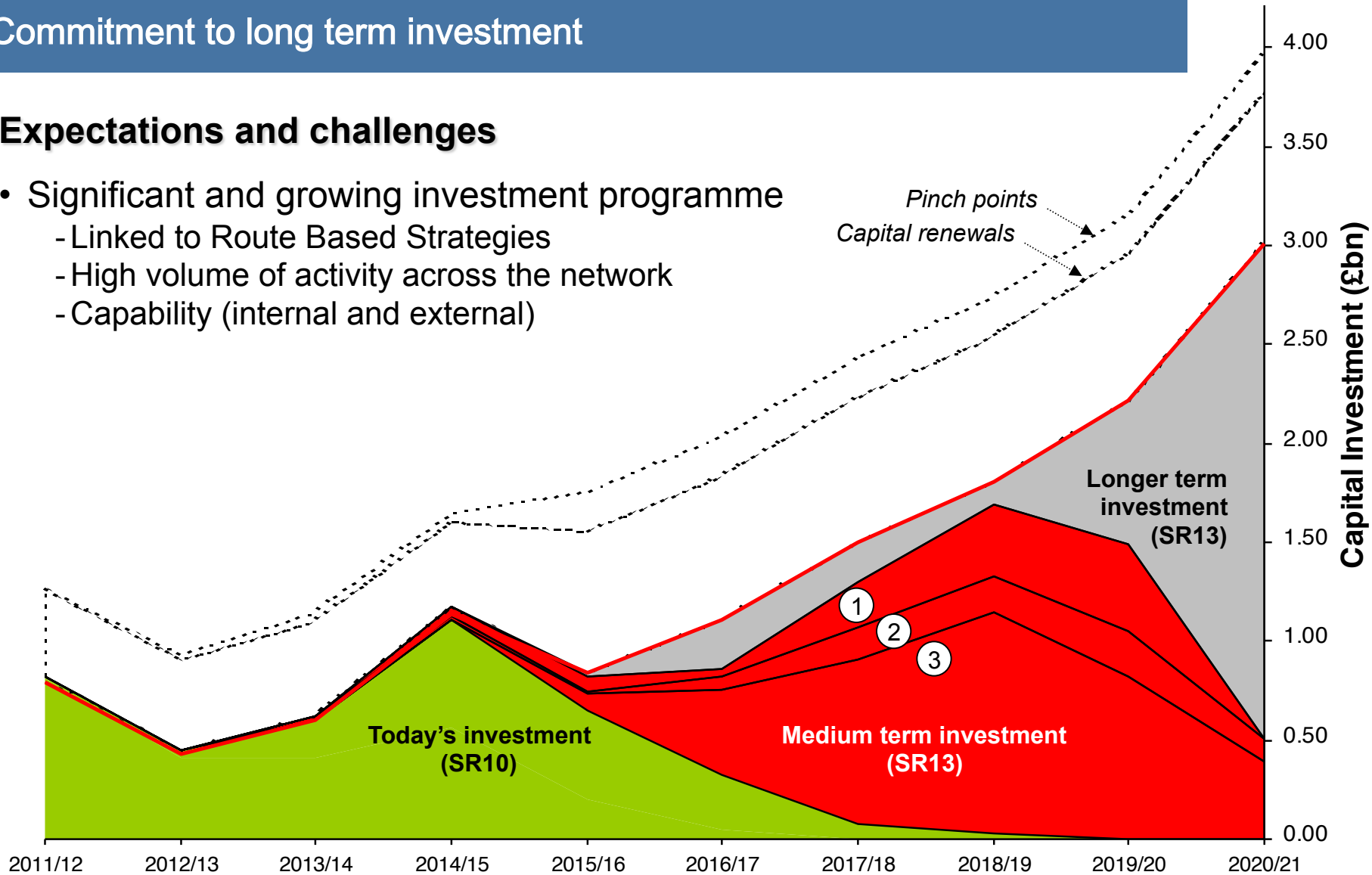
- £5bn framework (4 + 2 years)
- 4 lots
  - 1 design
  - 3 construction
- Flexibility
  - Programmes, projects, across lots, plus individual tasks
  - Incentivisation at programme, project & task level
- Lot structure to stimulate development
  - Opportunities presented to encourage entry by suppliers with a broad range of capabilities
  - Upper limits on Lots increasing through the framework life depending on growing supplier capability

# Highways Agency Future Investment Programme

Commitment to long term investment

## Expectations and challenges

- Significant and growing investment programme
  - Linked to Route Based Strategies
  - High volume of activity across the network
  - Capability (internal and external)



# CDF Continuous Improvement Requirements

- **All lots are required to**
  - **Deploy strategic use of lean**
  - **Ensure Lean Leadership**
  - **Deliver Customer Value**
  - **Adopt Lean Structure and Behaviour**
  - **Ensure Process Flow**
  - **Create standard work practices**
  - **Ensure Process Control and Quality**
  - **Ensure Planning Design and Construction takes account of customer/client requirement**
  - **Deploy Effective equipment maintenance**
  - **Maintain effective supporting infrastructure**
  - **Record benefits of improvement**

# Some Examples



Safe roads, Reliable journeys, Informed travellers

## A1 Dishforth to Barton Improve Motorway Communications D

### Purpose:

- Maximise the output rates for installation of communications ducting

### Deliverables:

- Root causes of delay and poor efficiency identified
- Procedures and Controls for sustained improvement
- Documented process
- KPI's and monitoring / reporting procedures identified

### Improvements to Date:

- Now using 9m length pipes rather than 6m resulting in productivity
- Reduction in air testing based on failure rate
- Activity sequence revised to install concrete to avoid associated issues

### Benefits to Scheme:

- Reduced number of joints saving £15k in cost
- Productivity benefits based on 30km remaining to programme
- Potential productivity increase of 15% by red

### Transferability to other schemes:

- Significant reduction in H&S risk (man hours reducing/eliminating air testing)
- 280km of buried cable to be replaced with ducting using 9m lengths used.

Safe roads, Reliable journeys, Informed travellers

## A46 Newark to Widmerpool Efficiencies in Chamber Construction

### Objective:

Update drainage chamber construction to reduce waste in labour and materials.

### Stakeholders:

Main contractor (Balfour Beatty)  
Designer (Scott Wilson)  
Materials (Polypipe)  
Installer (Parkway, Rouse)  
Supplier (Burdens)

### Deliverables:

New chamber type enabling leaner, safer on-site construction

### Target Benefits

- Installation of pipes and chambers by a single gang
- Eradicated need for wet trades
- Eradicated need for in-situ concrete cutting
- Reduced component weight / improved manual handling
- Transferable solution
- Preliminary estimate of £200-250k saving on this scheme, primarily from increasing labour efficiency.

Safe roads, Reliable journeys, Informed travellers

## A1 Dishforth to Barton Improvement Maximising Blacktop Laying Efficiency

### Objective:

- Maximise Laying Rates
- Increase utilisation of Plant and Labour
- Ensure Delivery to Programme

### Deliverables:

- Maximised Productivity/Efficiency
- Root causes of delay & poor efficiency identified
- Procedures and Controls for sustained improvement
- Capacities and Constraints Identified.

### Improvements to Date:

- Paver theoretical capacity is 330 tonnes/hr, however each individual coating plant can only produce 100 tonnes/hr. By changing the supply method and working time, paver gang working hrs have been halved and output doubled.
- New working procedures at shift start-up increased paver working time by over 8%.
- Mitigation plans and improved communications have minimised delay associated supplier plant breakdown.

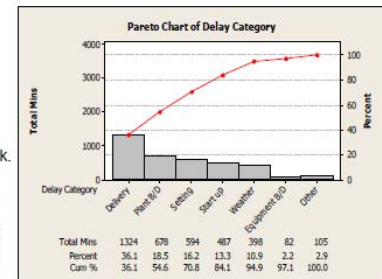


### Benefits to D2L:

- 100% increase in productivity.
- 17 day reduction to programme.
- Saving of 34 Gang working days.
- Estimated savings in excess of £600k.

### Transferability to Other Schemes:

Evaluation of 2 shift working suggests a potential saving of £1.4m for similar sized scheme.



'Awaiting Delivery', 'Plant Breakdown' and 'Delay before Start of Laying' accounts for 70% of all recorded delay





# Lean Programme Governance

**Lean Project Tracker**

Show:  People  Benefits  Progress  Key Dates

Sort by:

Showing 129 / 129 projects

UID	Project Title & PID Link	Company	Scheme / MAC	Practitioner	Updated	Updated By
N043	3D Control of Drainage	SKANSKA BALFOUR BEATTY (SBBJV)	M25 Widening Project	Matt Turlington	17/03/2011	BCE01619
N074	AMI Reliability	MOUCHEL		S Werrett	09/03/2011	SWERRETT

## Project Tracker

## Define the Lean Project

AGGREGATE INDUSTRIES  
**PAVER PRODUCTIVITY**

Unique ID: N089 | Project Status: Active | Updated: 24-Mar-11 by NICK PARRY

Comments

Project Description  
Increase Paver productivity in a given shift by identifying and reducing wasted and non-value

HA Tech Manager	Sue Housley
Practitioner	Nick Parry
Champion	Steve Cassie
Team Members	Gordon Smith, Ross Turnbull, Adam Harper, Dave Richardson

Scheme: Various - Area 10 Schemes

Purpose	Quad of Aims
Increase Paver outputs	Company - More efficient turnover from becoming Client (H.A) - Benefits from programme durations, n
Reduction in costs per tonnes laid	Road users - Less disrupt of highways Improved o
Reduce programme durations	Employees - Less frustra security
Maintain safety and quality standards	Supply chain - Driven to stronger relationship w
Provide estimators with realistic data to become more competitive	

## Status Report

**HIGHWAYS AGENCY** Lean Division Monthly Status Report April 2011

**Overall Savings**

**Key Progress**

**Key Risks**

**Key Issues**

**Charts Summary**

**LSS Spend – Forecast vs. Actual**

**Lean Projects 'Status'**

Of the 60 active projects  
 24 are at Green status – updated in the last four weeks  
 19 are at Amber status – updated in the last four weeks but not in the past two weeks.  
 60 are at Red status – not updated in the last four weeks.  
 0 is at Blue status – flagged by Practitioner as requiring support.

**Lean Projects Performance**

**Current Savings**

**Legacy Savings**

**Headlines**

Who now needs to do what

# Our Vision

- Delivery of measurable efficiency improvements
  - Time compression /Cost
  - Safety
  - Carbon
- Develop industry capability using lean thinking ( Adapted Toyota Production Model)
- Significant industry shift towards continuous improvement





# Thank You

## More Information & Contact details

<http://www.highways.gov.uk/specialist-information/lean-improvement/>

<http://leanconstruction.org.uk/#>

## Lean Construction Institute UK