Lean & Sustainability in the Alliance

Lean in the Public Sector

Nottingham Trent University

19&20 September 2013

@one

love every drop.

anglianwater

Anglian Water

Our region stretches from the Humber north of Grimsby, to the Thames estuary and then from Buckinghamshire to Lowestoft on the east coast.

Our 80,000 km of water and wastewater pipes could take us a quarter of the way to the moon! They supply and transport water across an area of 27,500 square km.

We're the largest water and wastewater company in England and Wales by geographic area.

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The @one alliance

The @one Alliance is a collaborative organisation comprising client, design consultants and contractors, formed to deliver a large part of the Anglian Water AMP4 & AMP5 capital investment programme

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AMP5 Initiatives

Initiative	Opportunities
Commercial and Overhead	• Single bank account • AMP5 contracts • Cost assurance • Owner controlled insurance
Common Delivery Process	• Project Definition • Application of gateways • Allocation to delivery routes
Product-based Delivery	• **Development of standardised products** • **Integrated Sustainability in Design team**
Supply Chain	• Common frameworks • Performance management
Risk and Value	• Application of R&V across whole programme • Enhancement of the R&V process • Enhancement of the root cause analysis tool
Waste	• **Reliability of task completion** • **Rework** • **Materials waste**

Corporate Responsibility & Sustainability

Sustainability in construction: to be recognised as leaders in the industry through empowering all sites to deliver sustainable construction

Energy and carbon: To have low carbon and energy solutions consistently driving innovations and efficiency

Sustainability in design: to have demonstrable benefits from adopting sustainable design across all projects and standard products

Waste: to have lean principles embedded as normal practice to eliminate all forms of waste

Financial performance: to have decision making processes representing a leading model for a sustainable business

Ecology and environment: to have zero environmental incidents and an environmental strategy aligned to Anglian Water Services

Supply chain: to have an ongoing engagement with our supply chain in providing sustainable products and services

Health and safety: to have a common and industry leading H&S culture

Local communities/Customer satisfaction: to be working in partnership with local communities

Training and education: to be recognised as a leader in the development of leadership, change management and improvement in the construction sector

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AMP5 Initiatives

Waste Initiative: to have lean principles embedded as normal practice to eliminate all forms of waste

	The 8 Lean Wastes	@one Alliance equivalent
1	Overproduction	Reliability of task completion
2	Overprocessing	
3	Waiting	
4	Unnecessary Motion	
5	Unnecessary Transport	
6	Underutilisation of Skills	
7	Defects	Rework
8	Inventory	Materials Waste

Changing the Alliance culture

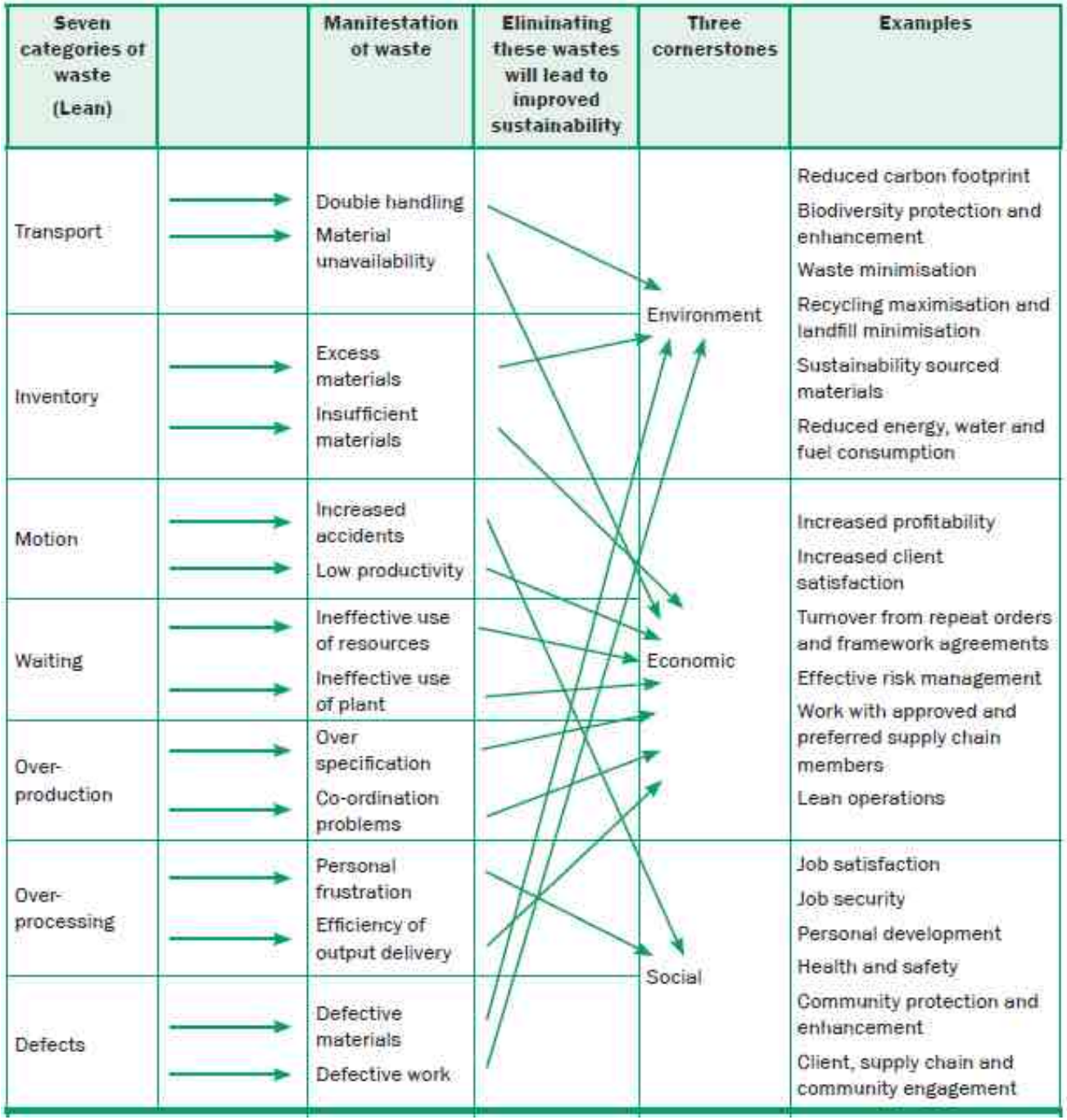
Changing the way we think about **waste & sustainability**…

We are making **waste & sustainability** visible and challenging teams to reduce all aspects of **waste** and improve all aspects of **sustainability**…

Making **waste & sustainability** visible has enabled us to make decisions about which process improvements to work on first…

Lean and Sustainability

To inspire joined up thinking, we illustrate the link between **lean construction** and **sustainability**…



The links between Lean construction and sustainability (adapted from Shepherd Construction)

Reliability

Doing <u>what</u> we said we were going to do, <u>when</u> we said we were going to do it

Collaborative Planning

What are we planning to do?

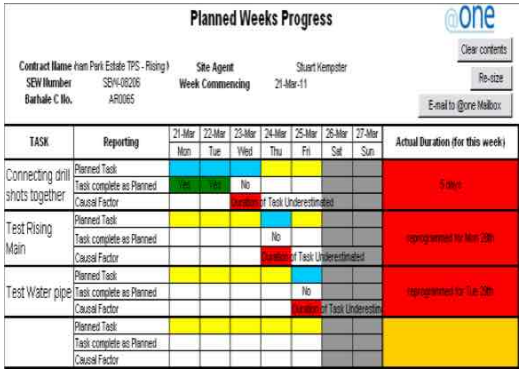
> planned tasks - what / who / when

Production Meetings

Did we achieve what we were planning to do?

> actual tasks completed compared to planned tasks

Reliability Reporting



What stopped us doing what we planned to do?

> identify blockers

> use data for process improvements

Rework

During the Construction Phase, we measure Rework using the Punchlist…

E41 - PROJECT PUNCH LIST

SEND (e-mails go to BuildOnline and Punchlist Return mailbox)

Sub-programme Ref:	
Project / Scheme Title:	
Scheme Number:	

Punch List Owner (Site/Project Manager)	
Project Manager	
Operations Manager	
Team Manager (Construction)	
Alliance Lead Commissioning Engineer	

Print Punchlist

NOTE: MACROS MUST BE ENABLED FOR THIS WORKSHEET TO FUNCTION CORRECTLY

		Where	What	Who		How	When				Why		Closure	
Item No.	Priority	Location of Item	Activity / Description of Item	Originator	To be actioned by	Action Required	Date issue raised	Required Action Date	Actual Action Date	Approx. Cost of work	Alliance Causation		TMC/CE Sign-off	Suggestion to prevent reoccurrence (Optional)
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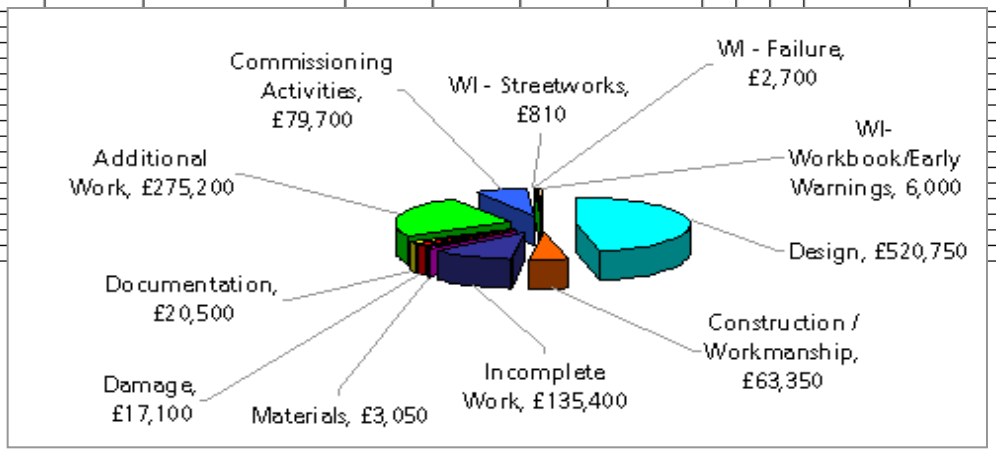

Designing out Waste and Carbon

Driving the zero waste to landfill and lower carbon ethos by working with the design teams to reduce the amount of waste and carbon we produce…

wrap

buildoffsite
promoting construction offsite

standard products

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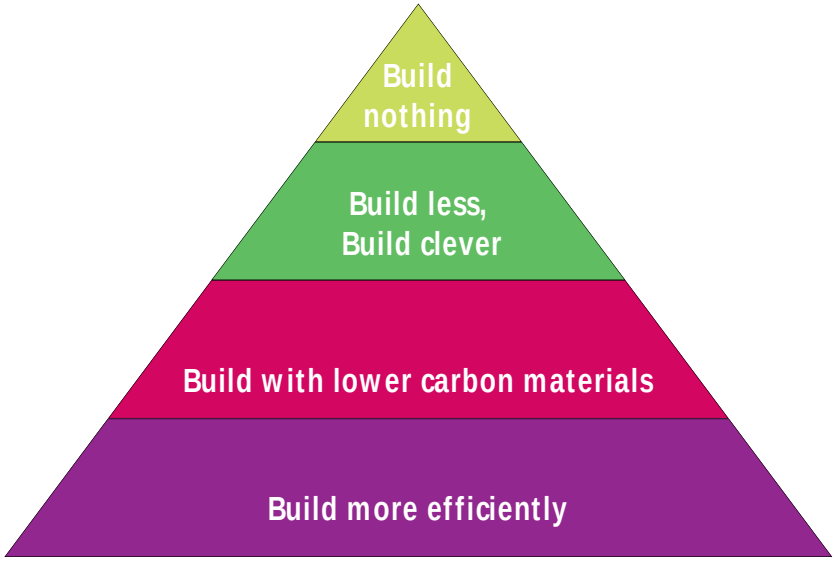
Embedding Waste Reduction through Sustainability

We have developed a number of process and toolkits to enable our designers to consider carbon and waste at the outset of their designs…



Sustainability hierarchy

Our design engineers use a four-stage process to remove embodied carbon and waste at the project planning stage.

SUSTAINABILITY IN DESIGN EXAMPLE

Idea	Re-design existing product to reduce embodied carbon by 50%	Area	WWNI
Project Title	Wastewater chemical dosing	Category	Standard Product & Good Practice
SEW/ WAT/ Product Code	Product 134b	No.	3
		Date	31.08.11 (issue 3)

Root cause and drivers

An interdisciplinary team was set up to determine if a generic dosing product package could be developed for ortho or ferric or other materials dosing :-

Root cause :- Carbon was not directly considered for the original product. Can embodied carbon reduction be achieved?
Driver :- Reduced embodied carbon

Solution

29 schemes over AMP5 are due to be installed from 5m3 to 30m3 storage size of ferric, with the same basic control philosophies applied.

This product is an update of the AMP4 product, but with design reduced to the minimum required to achieve the plant requirements.

Carbon savings

Description	Project start	Gateway 3	Change %
CAPEX	Affordability £ 116k	Latest £110k	-5
OPEX	No change	No change	No change
Embodied Carbon	53 tonnes	24 tonnes	-54
Operational Carbon	6.5t/a	6.5t/a	No change
Waste Reduction	-	-	Coming soon

Main sustainability components

Greatest carbon reductions.
Product reduced from 2 tanks and large kiosk to single self bunded tank and small kiosk.
Smaller base and ancillaries for installation required.
Still full assembly of units off site and simple installation
Detail of any other particularly sustainability activity undertaken on the project.
Smaller systems will be much easier to install on small sites with difficult access
Supplier may also be useful for other products / applications

Key Contacts

IProcT	Warren Bigwood
Operations	Simon Toulson
Product	Peter Caldwell

Best practice examples

Drop in sessions

Product-based delivery – Standard Products

A product is a standard unit of asset delivery which delivers more value the more times it is used

- initiative developed to drive efficiencies within our delivery programme
- move away from bespoke designs to standard modular solutions
- through the use of Standard Products we reduce redesign, rework and waste…
- which in turn minimises design time, project expenditure and construction programme

> “design the product once
> get it right
> use it many times…

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Product-based delivery – Standard Products & Build Offsite

Wastewater UV channels

- Traditionally concrete channels constructed on site
- Worked with suppliers to develop an offsite modular UV channel
- Full testing in the factory – plug and play
- Reduced construction time from 16 to 8 weeks
- Removes the need for kiosk for control panel; no requirement for planning permission

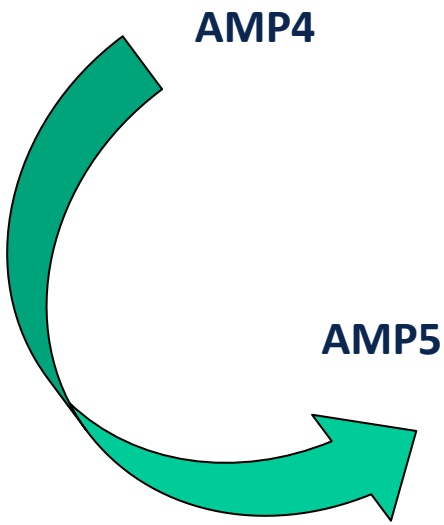
Product has enabled **56%** cost saving across 5 projects

52% saving on embodied carbon and significantly reduced waste

Product-based delivery – Standard Products & Build Offsite

Chlorination Standard Product

- New Standard Product manufactured and tested off-site reducing on-site construction activities
- Assured visual appearance and right first time build quality
- Large reduction in material waste and embodied carbon
- Health and safety risks reduced due to less work on site
- Savings currently being quantified but expected to be greater than 20%



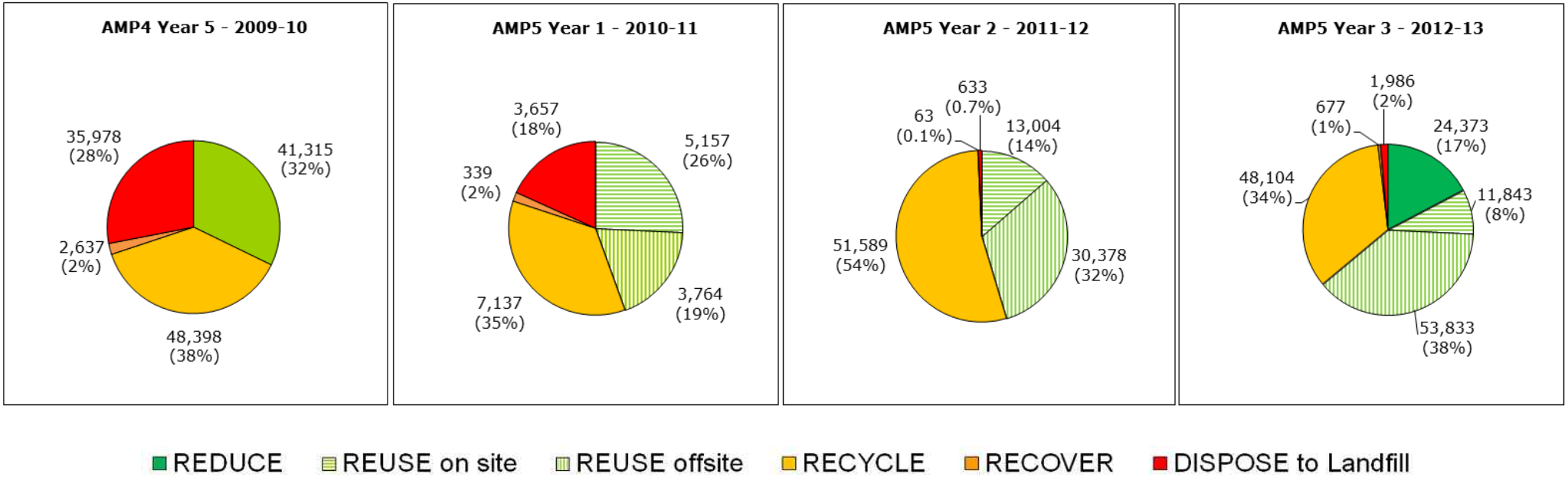
Product-based delivery – Standard Products & Build Offsite

Water Treatment Works

Booster station assembled and tested in the factory, delivered to site and craned into place for final connections to be made

Materials Management

Driving the Zero Waste to Landfill ethos by working with the construction teams to use improved waste management techniques to deal with the waste we create



In summary…

In AMP5, between April 2010 and June 2013:

- 30% estimated reduction in waste production
- over 260,000 tonnes waste diverted from landfill
- increase in waste diverted from landfill from 72% to 98%
- increase in reuse of material from 32% to 46%
- 34% reduction in embodied carbon and 80% reduction in operational carbon
- no infringements on protected species and one category 3 pollution incident
- Accident Frequency Rate equal to 0.11
- ongoing engagement with our top 50 suppliers on health & safety, sustainability, carbon management, waste reduction, and environmental issues
- supply chain included in health & safety and environmental training
- more than 90% of our workforce recruited from the East of England and almost 60% of our expenditure spent with local suppliers
- more than 20% reduction on expenditure compared to the business plan forecast