


Delivery of a Viable SuDS Development

Alastair Atkinson

15/10/2013

UNITED BY OUR DIFFERENCE 

The Old Chestnut -Capital costs



vs.



Sewers


SUDS

What other costs affects viability?






			
Land	Masterplan and density	Pipes	Swale
			
Ecology	Landscape	Bond	Maintenance

Thoughts on key cost drivers



1. Professional team approach
2. Site conditions
 - a) Topography
 - b) Geology / Permeability
 - c) Contamination
3. Developer approach
4. Attitude of the Lead Local Flood Authority (LLFA)

What also can affect cost?



- Site size
- Hydrological location
- Presence of high groundwater and/or contaminated soils
- Capacity for infiltration
- Past site use – greenfield / brownfield
- Building(s) dominating the site
- Topography
 - Steep sites
 - Flat sites



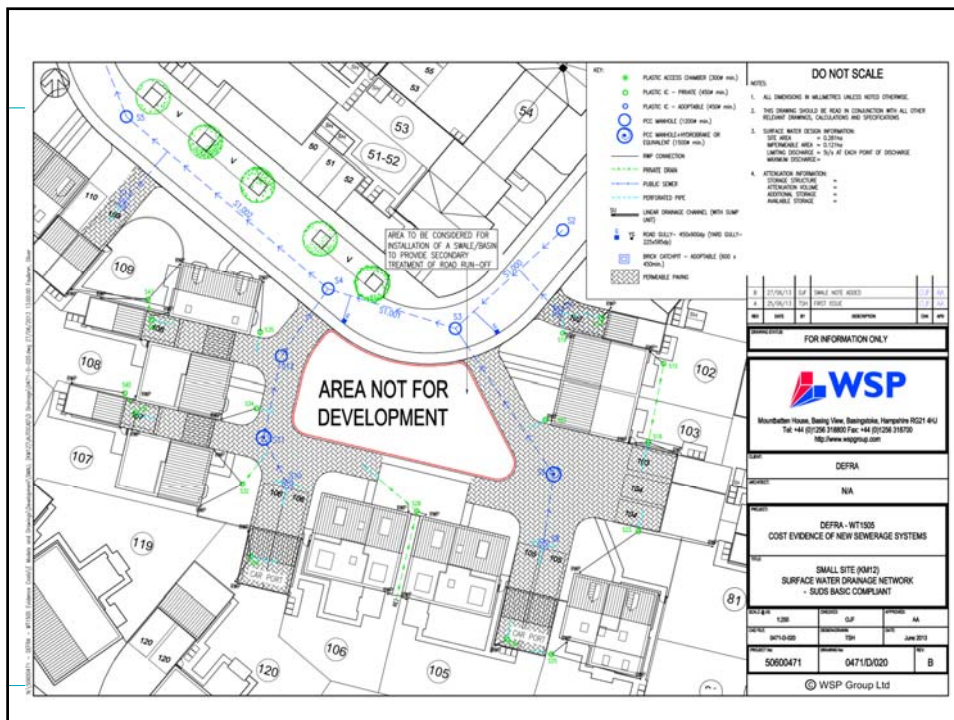
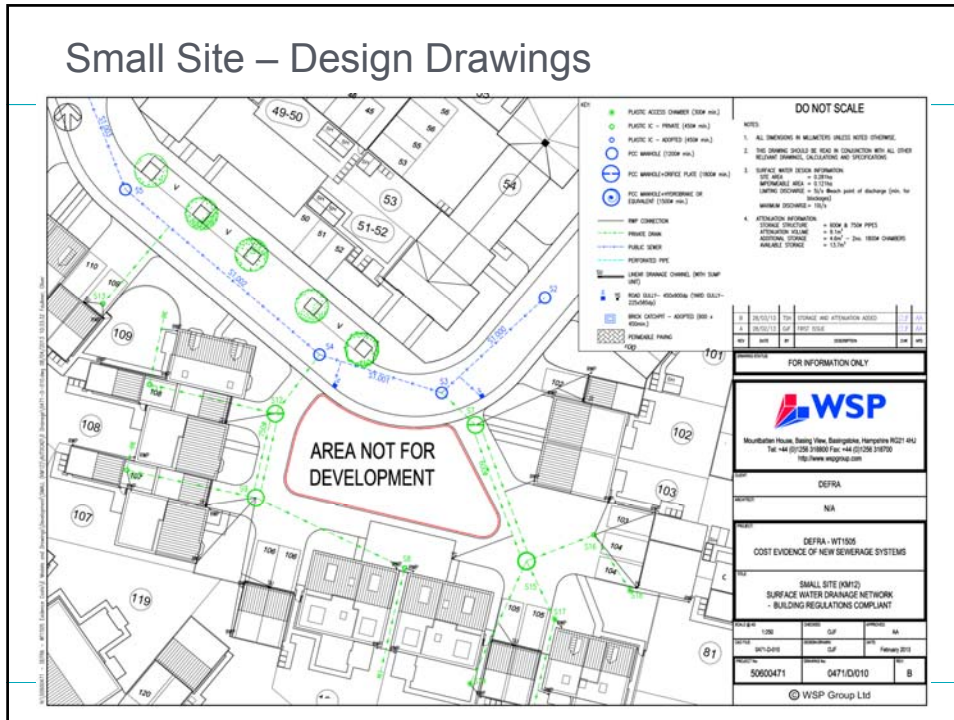
The DEFRA Project

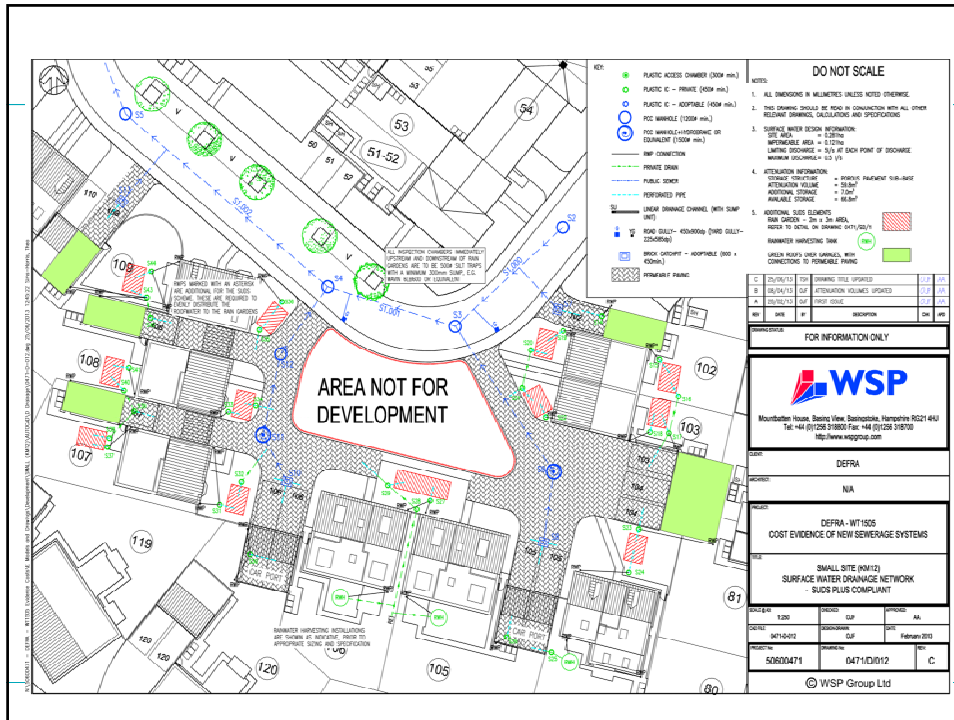


- **Aim:** to provide costs associated with the construction and operation of drainage systems for three typical residential developments based on the three standards; the Building Regulations, Sewers for Adoption and the proposed SuDS Standards.
- Three 'typical' residential developments:
 - Small: 8 dwellings
 - Medium: 32 dwellings
 - Large: 210 dwellings



Small Site – Design Drawings





Small Site Capital Costs

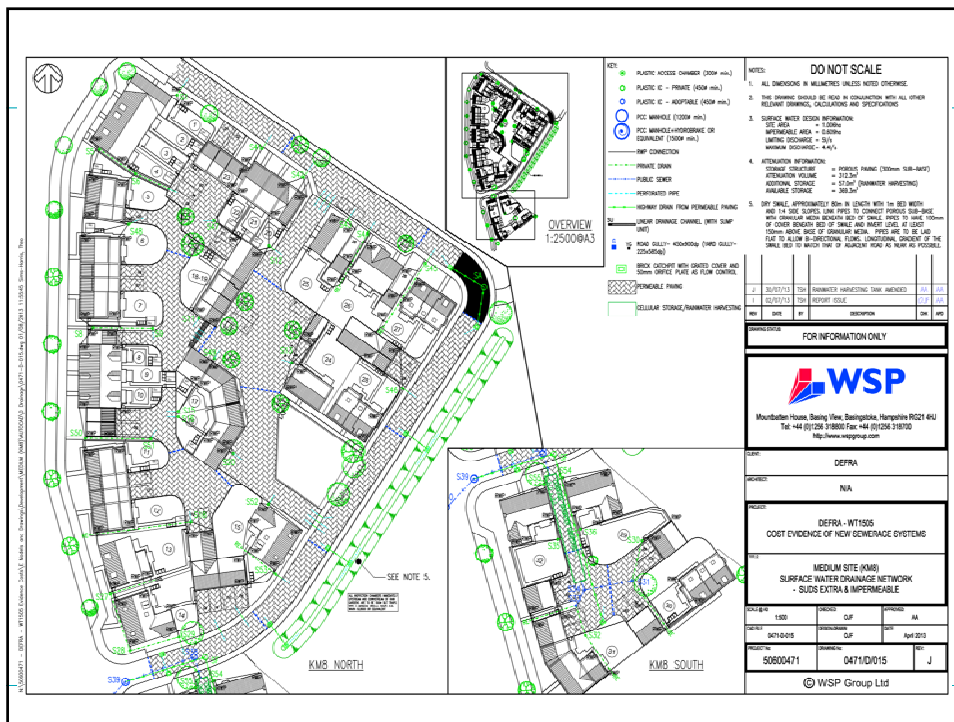
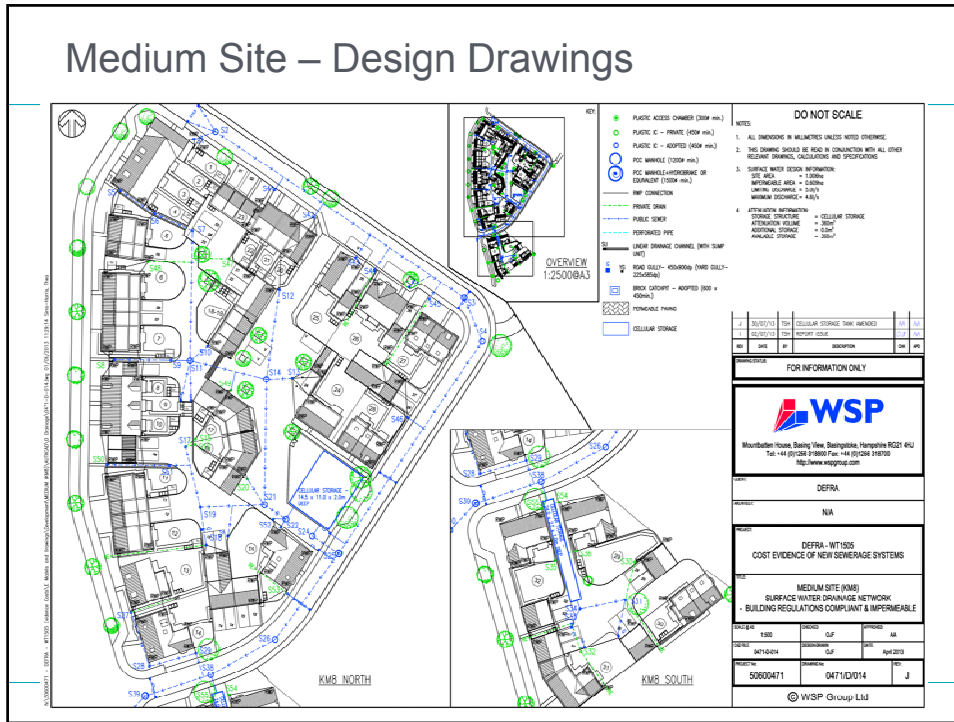


Design Standard	SuDS Normal (£44.6K)	SuDS Extra (£70.8K)
B. Regs (£54.5K)	-£9.9K 18% less	+£16.3K 30% more
SfA 7 (£64.0K)	-£19.4K 30% less	+£6.8K 11% more

Cost comparisons between Standards for small site with impervious soil – 2 outfalls

Costs	SuDS Normal	B. Regs	SfA 7	SuDS Extra
Total	£44.6K	£54.5K	£64.0K	£70.8K
Per property	£5.6K	£6.8K	£8.0K	£8.9K

Small site - Capital cost per property of each drainage scheme (in cost rank order) – two outfalls



Medium Site Capital Costs



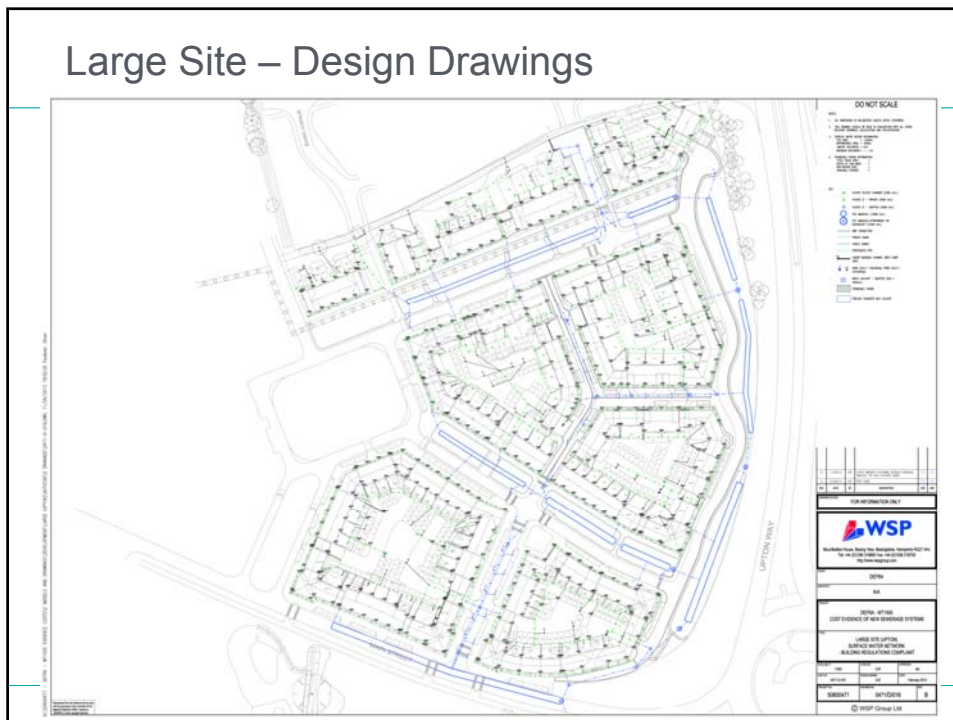
Design Standard	SuDS Normal (£99.9K)	SuDS Extra (£144.8K)
B. Regs (£198.6K)	-£98.7K 50% less	-£53.8K 27% less
SfA 7 (£198.6K)	-£98.7K 50% less	-£53.8K 27% less

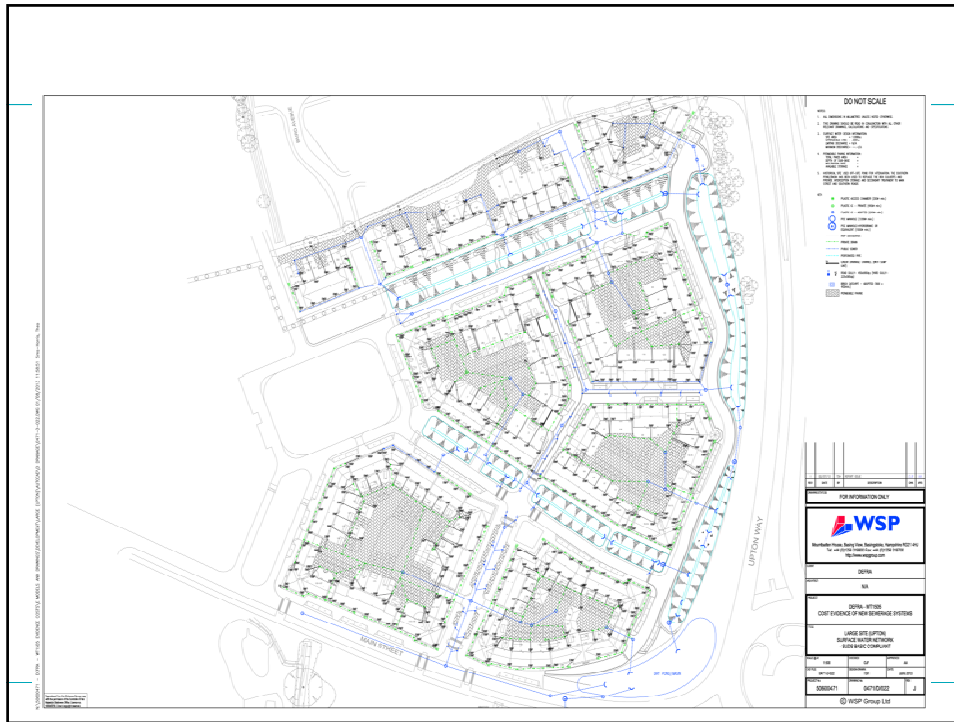
Cost comparisons between Standards for medium site with impervious location

Costs	SuDS Normal Pervious	B. Regs & SfA 7 – Pervious	SuDS Normal Impervious	SuDS Extra Impervious	B. Regs & SfA 7 Impervious
Total	£44.4K	£221.4K	£99.9K	£144.8K	£198.6K
Per property	£1.4K	£6.9K	£3.1K	£4.5K	£6.2K

Medium Site - Capital cost per property of each drainage scheme (in cost rank order; Pervious and Impervious)

Large Site – Design Drawings





Large Site Capital Costs



Design Standard	SuDS Normal (£643K)	SuDS Extra (£1145K)
B. Regs / SfA 7 (£1,441K)	-£798K 55% less	-£296K 21% less

Cost comparisons between Standards for large site with impervious soil

Costs	SuDS Normal	SuDS Extra	B. Regs & SfA 7
Total	£643K	£1145K	£1441K
Per property	£3.1K	£5.5K	£6.9K

Large site - Capital cost per property of each drainage scheme (in cost rank order) - Impermeable

Annualised Maintenance Costs

	Maintenance Costs SuDS – B.Reggs	Cost Difference	Maintenance / Capital Cost %
Small site – Normal	■ £248 - £188	■ +£60	~0.6%, ~0.3%
■ Small site – Extra	£358 - £188	+£170	~0.5%, ~0.3%
■ Medium site – Normal	■ £776 - £1598	■ -£822	~0.8%, ~0.8%
Medium site – Extra	£1128 - £1598	-£470	~0.8%, ~0.8%
■ Large site – Normal	■ £4969 - £3282	■ +£1687	~0.8%, ~0.2%
■ Large site – Extra	£5173 – £3282	+£1891	~0.5%, ~0.2%

*+ve means SuDS is more expensive on cost difference

Annualised comparison of maintenance costs between SuDS and B. Regs – Public Realm

Category	Small Site Annualised Cost	Medium Site Annualised Cost	Large Site Annualised Cost
Rainwater harvesting	£293	£98	£587
Green roofs	-	N/A	N/A
Rain-gardens	-	N/A	N/A

Annualised SuDS maintenance costs – private ownership

Land Take Costs



Site	SuDS Normal	SuDS Extra
Small site	None	£6K
Medium site	None	£37K
Large site	£305K	£305K

Land take costs of SuDS – (ignoring public open space requirements)

Comparison of Costs for Large Sites - Capital, Maintenance and Land-Take



	Large Site		
	B.Reggs/SfA	SuDS Normal	SuDS Extra
Capital costs	£1,441K	£643K	£1,145K
Land take costs	n/a	£305K	£305K
TOTAL	£1,441k	£948k	£1,450k
Annualised Maintenance costs	£3,282	£4,969	£5,173

Cost Comparison between the use of B. Reggs, SuDS Normal and SuDS Extra Drainage Schemes for Large Sites

Summary of Practical Advice



1. Multi-use SUDS are essential.
2. Keep the designs simple, if you mix SUDS and positive pipes it will cost you more.
3. Work with the topography where possible
4. Keep control structures multiple simple but use multiple discharges
5. Don't double count the storage required.
6. Rain Gardens provide cost effective source control
7. Underdrained swales cost effective interception and treatment.
8. Porous pavements were cost effective especially when they were not lined

Summary



1. SuDS can cost less when properly designed
2. Appropriate SuDS work – inappropriate SuDS don't.
3. The Pre- Application advice/guidance you give will be key to getting viable designs.
4. The layout and approach of the designer is key.
5. Education of the development industry is key for success.
6. Don't forget about the geology.

