BUSINESS IN THE COMMUNITY

THE PRINCE'S RESPONSIBLE BUSINESS NETWORK

Case Study: Burnage Academy for Boys

SuDS Audit – March 2016

Background

Burnage Academy for Boys draws pupils from the Manchester districts of Burnage, Didsbury, Levenshulme, Longsight, Rusholme, Fallowfield, Withington, Hulme and Ardwick.

The college was founded in 1933 and it has gained a strong record of sporting, academic, artistic and cultural success. The 'Academy' has 953 pupils and over 148 teaching and support staff.

In 2010 a £17m redevelopment of the school under the Government's Building Schools for the Future programme was undertaken which saw the original 1930s and 1950s buildings demolished and replaced with a new building.

The remaining two modern buildings including the sports hall were refurbished and an all-weather sports pitch was constructed where the older buildings had once stood.

In the centre of the school footprint there is an elevated grass sports field.

The school which was previously a community school administered by Manchester City Council, was converted to academy status on 1 April 2014 and was renamed Burnage Academy for Boys.

Surface Water Charge Status

- The chargeable surface area is 28,120m2
- Charge Banding 10.

Prior to 2015 the School was classified as band 9 based on an aerial photo analysis. The Academy requested United Utilities conduct a review of the site area with a view to dropping down to band 8. United Utilities sent their contractors to physically review the site drainage and they found that the field drains from the sports pitch are connected to the public sewer. Subsequently the sports pitch was then added to the site area and as a consequence the surface drainage area was recalculated as 29,261 m2 which resulted in the banding change from 9 to 10.

Prior to the SUDS audit the 'Academy' Estate Manager provided a United Utilities Bill and the drainage plan for the site, see Appendix 1. All surface water runoff from the 'Academy' is disposed into the sewer system, a proportion of which is via an attenuation tank located to the north of the artificial sports pitch.

Site Audit Findings – See Appendix 2 for the location of potential SuDS

Map Reference A – Elevated Sports Pitch – surface water currently drains into a French Drain on the western perimeter of the pitch. Subject to subsoil conditions surface water could be conveyed to a swale where the French Drain is currently located.

Figure 1 – Sports Pitch

Map Reference B - Pedestrian entrance off Burnage Lane, this is a hard surfaced impermeable area with a significant slope. Surface water runoff is currently intercepted by four Aco drains which traverse the space. If permeable paving were installed surface water could be allowed to soakaway. This would be dependent on the subsoil conditions

Figure 2 – Pedestrian Entrance

Map Reference C – The new main building has a flat roof and subject to structural loading capacity there could be the potential for installing an extensive green roof system here, which would be eligible for a 50% reduction in the surface area classification for that space. A parapet and a deadman systemis in place which would enable maintenance to be undertaken. Account would need to be taken of the roof lights.

Figure 3 – Roof on New Main Building

Map Reference D – The internal courtyard of the 1990's build contains some green space that is intercepting rainwater. Through the installation of further green space or permeable paving material surface water runoff in this space could be eradicated. This would be subject to subsoil conditions.

Figure 4 – Internal Courtyard

Map Reference E – The small utility building adjacent to the pedestrian entrance off Burnage Lane could, subject to structural loadings, accommodate an extensive green roof system.

Figure 5 – Utility Building

Map References F to J – The freight containers and portacabins could, subject to loading host extensive green roof systems.

Figure 6 – Freight Container

Map Reference K - Water running off the carpark could be taken into a swale on the edge of the car park via slot kerbs. A small level change would be required on the existing green space to form a swale. This would also be dependent on ground conditions. There is a possible concern of excess water flowing into gardens behind so would need to think about installing an overflow back into the sewer, however, this would mean that a United Utilities surface area reduction would not apply.

Figure 7 – Grass Verge Sports Centre Car Park

Map Reference L - Water running off the bike-shed roofs could be diverted into a permeable surface inside the bike-shed subject to ground conditions.

Figure 8 – Bicycle Sheds

Map Reference M – Part of the Service Road to the north of the main school buildings has a permeable cellular grassed paving system in place. This system could be extended, subject to sub soil conditions.

Figure 9 – Service Road with Cellular Grassed Paving System

Recommendations / Outcomes

The SuDS site audit identified scope for a range of interventions most notable of which would be the installation of an infiltration measure on the grass sports pitch, such as a swale, which would achieve a band change from 10 to 8 resulting in an annual cost saving of £15,594.49.

To view the completed 'Business in the Community Ready- Reckoner' which sets out all the potential interventions, associated costs, band change / cost saving and payback period see Appendix 3.

Constraints

The main constraint for installing SuDS that would help contribute to a reduction in the chargeable surface area is the underlying soil conditions.

The 'Academy' Estate Manager provided a borehole report which was carried out before the redevelopment of the 'Academy' and this found that the dominant subsoil was clay. Therefore, it is crucial that if infiltration SuDS are to be delivered then soakaway tests would be required to determine the viability of these measures.

Opportunities

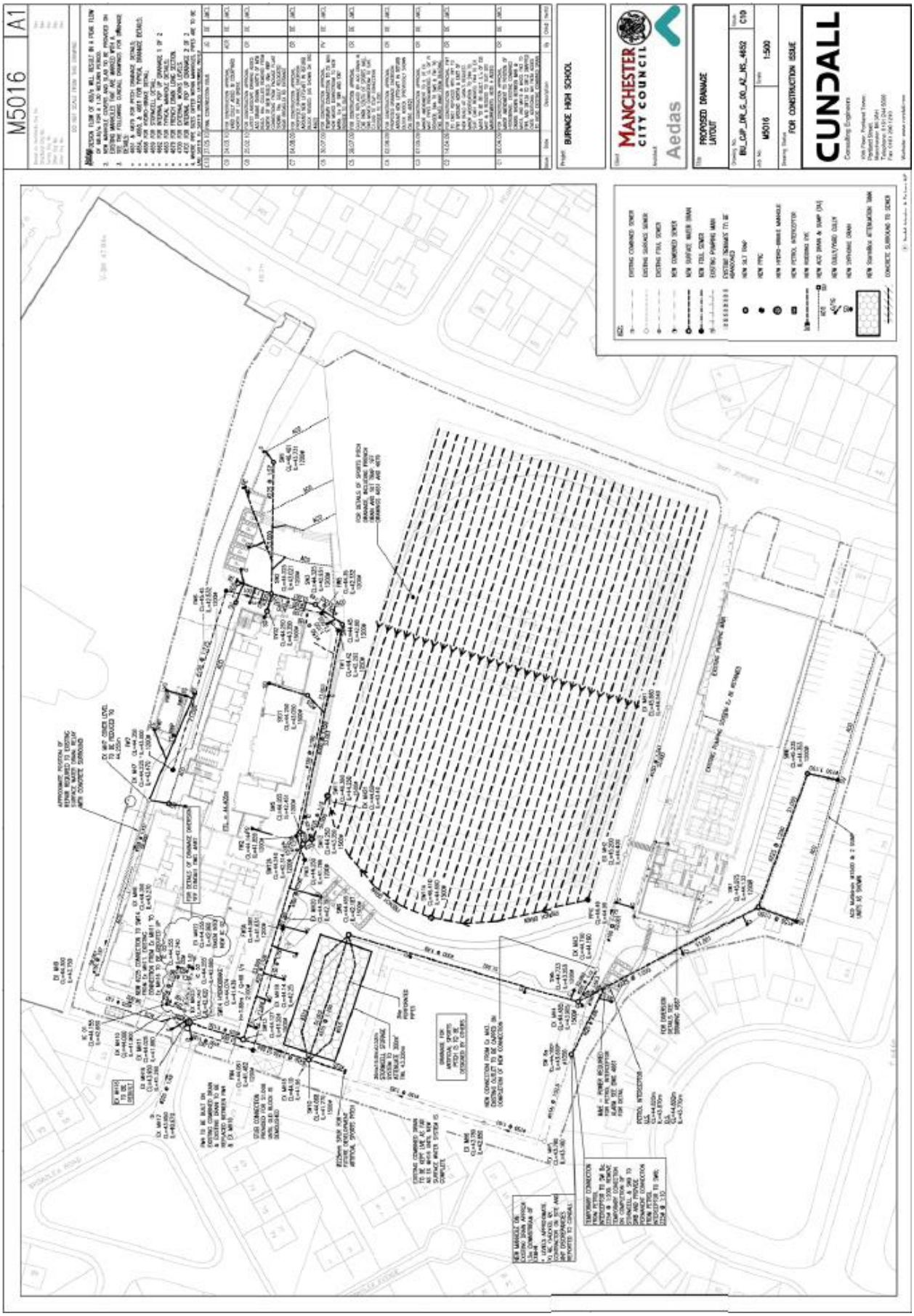
Located 186m to the north of the 'Academy's' border is the Shawbrook. Subject to further analysis there could be the potential to make a connection from the 'Academy' to take a significant volume of the schools surface water into the brook. This would achieve a significant reduction in the chargeable area that could result in a new banding of 8.

The cost of undertaking this connection would likely be significant and consent would be needed from the adjacent Green End and St Bernard primary schools and St Bernard's Church where the connection would need to pass through. However, there is the scope for making this a collaborative piece of work for with costs shared as this would potentially lead to significant surface reductions in chargeable areas for all involved.

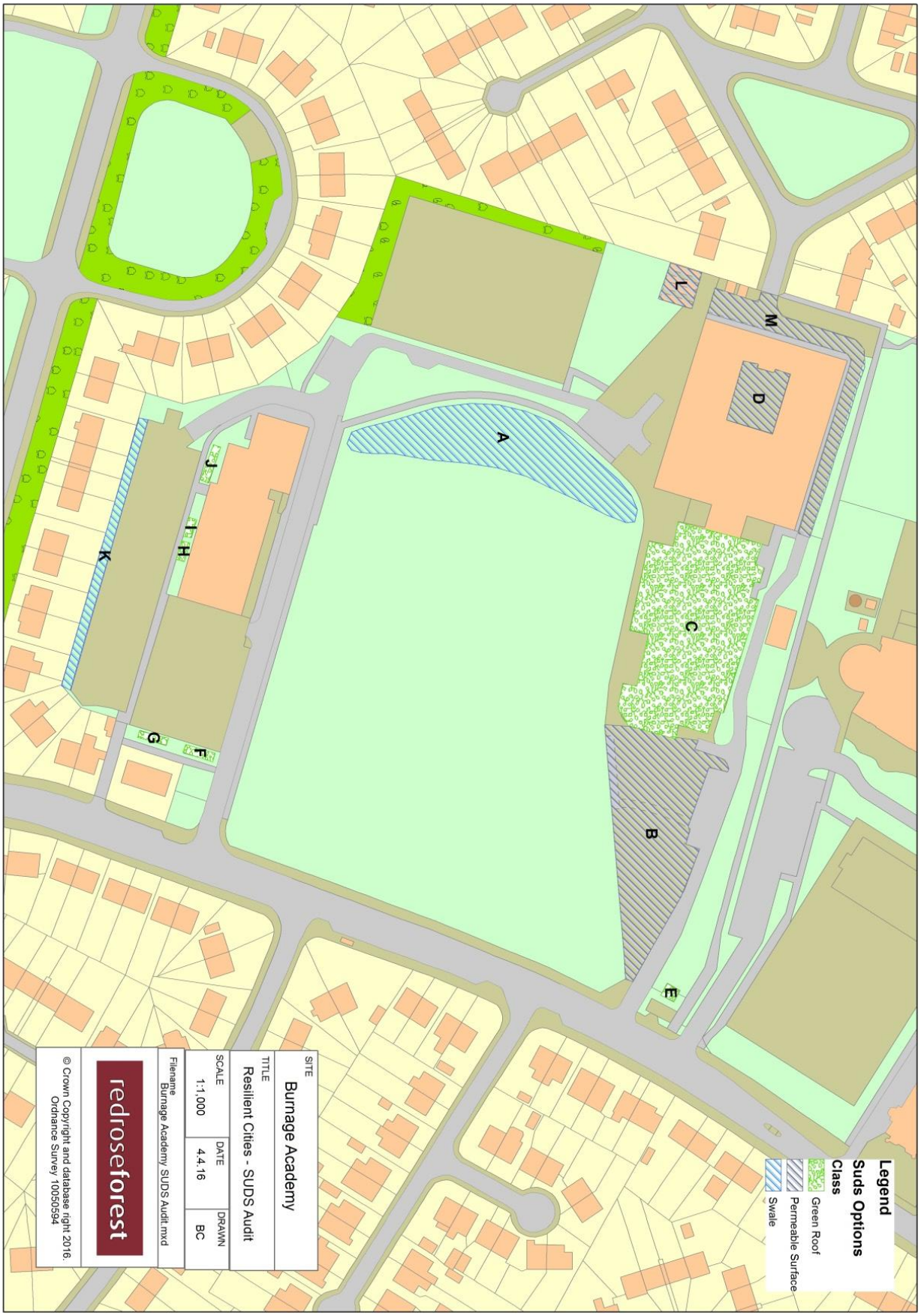
It is recommended that further investigation into the engineering feasibility of making a connection to the Shawbrook is made and if a positive outcome is derived then an approach should be made to the three schools and the church to discuss a potential joint undertaking.

Should soakaway tests demonstrate that infiltration into the subsoil is not feasible then an alternative option would be sink boreholes to a depth below the clay subsoil to allow rainwater via a surface SUDS feature into the underlying aquifer. A deep borehole test would be needed to ascertain the feasibility of this measure.

Appendix 1 – Burnage Academy for Boys Site Drainage Layout



Appendix 2 – Burnage Academy – Potential SuDS Interventions



Appendix 3 – Completed 'Business in the Community Ready- Reckoner'

BUSINESS IN THE COMMUNITY

THE PRINCE'S RESPONSIBLE BUSINESS NETWORK

Water Resilient Schools Ready-Reckoner

Site	Burnage Academy for Boys

Assessor	Pete Stringer
Payback Wanted	3.0
Estimated Payback	0.9
Shortfall/Surplus	-£46,356.01

Current Charges

Surface Water Band (from Bill)		10
Surface Water Charges (From Bill)	£	54,313.57
Hard-standing area - school calculation or UU calculation (m2)		29,261
Revised Band		10
Revised Charges	£	54,313.57
Initial Saving	£	-

Summary of Measures

Note: These costs are indicative only, refer to an expert for more accurate quotations

	Unit	Area Proposed	Area reduced	Capital m2 +50%, +100%	Capital cost £	Maintenance m2 +50%, +100%	Annual cost
Open channels on the surface	m length	0	0	£ 120.00	£ -	£ 1.10	£ -
Kerb / channel drainage	m length	0	0	£ 100.00	£ -	£ 1.10	£ -
Pervious and permeable surfaces	m2	0	0	£ 50.49	£ -	£ 1.08	£ -
Geocellular subsurface storage	m2	0	0	£ 35.37	£ -	£ 1.35	£ -
Filter strips	m2	0	0	£ 8.65	£ -	£ 0.29	£ -
Infiltration trenches	m2	0	0	£ 86.55	£ -	£ 0.87	£ -
Rain Garden	m2	0	0	£ 70.74	£ -	£ 2.70	£ -
Bioretention areas	m2	0	0	£ 70.74	£ -	£ 2.70	£ -
Soakaways	m2	0	0	£ 288.49	£ -	£ 0.14	£ -
Filter drain	m3	0	0	£ 346.19	£ -	£ 1.73	£ -
Swales	m2	450	12825	£ 43.27	£ 19,473.37	£ 0.29	£ 129.82
Infiltration basins	m2	0	0	£ 18.75	£ -	£ 0.29	£ -
Detention basin	m3	0	0	£ 51.93	£ -	£ 1.08	£ -
Retention basin	m3	0	0	£ 28.85	£ -	£ 1.44	£ -
Wetlands	m3	0	0	£ 11.80	£ -	£ 0.29	£ -
Wet Woodlands	m2	0	0	£ 40.39	£ -	£ 0.15	£ -
Trees (3m2 each)	1	0	0	£ 721.24	£ -	£ 7.21	£ -
Green roofs	m2	0	0	£ 245.22	£ -	£ 7.21	£ -
Downpipe disconnection	1	0	0	£ 247.38	£ -	£ -	£ -
Water butts	1	0	0	£ 247.38	£ -	£ -	£ -
Downpipe planter	m3	0	0	£ 494.77	£ -	£ -	£ -
Rain water harvesting	1	0	0	£ 3,894.67	£ -	£ 360.62	£ -
Other - Use comments	Item	0	0		£ -		£ -
	Total m2 reduced (UU)		12825		£ 19,473.37		£ 129.82
	Total m2 reduced (Highways)		0				

Still required to move 1 UU band	-8563
Still required to move 2 UU bands	-1563
Still required to move 1 Highway band	4262
Still required to move 2 Highway bands	11262

Note: Highways calculations are not live at present

Result

New UU Hardstanding area (m2)		16436
New UU Band		8
New Charges (UU)	£	**14,714.81**
New Highways Hardstanding (m2)		2025
New Highways Band		10
New Charges (Highways)	£	17,525.81
Total New Charges	£	**32,240.62**

Savings

Saving pa UU Band	-	£	-
Saving pa Measures		£	22,072.95

Payback

Payback Target (Years)		3.0
Capital Cost	£	19,473.37
Annual Cost	£	129.82
Total Cost over Payback	£	19,733.02
Direct Benefits per Year	£	22,072.95
Direct Payback in Years		0.9
Shortfall/Surplus	£	(46,356.01)

Possible Measures from Site Audit

Type (Choose)	Size of measure m2/m3/No.	Area Changed m2	Map Ref	Select
Swales	450	12825	A	■
Pervious and permeable surfaces	240	1050	B	■
Green roofs	100	50	C	■
Green roofs	2400	1200	D	■
Pervious and permeable surfaces	150	150	E	■
Green roofs	32	16	F	■
Green roofs	24	12	G	■
Green roofs	24	12	H	■
Green roofs	18	9	I	■
Green roofs	10	5	J	■
Green roofs	10	5	K	■
Swales	240	1440	L	■
Pervious and permeable surfaces	40	100	M	■
Pervious and permeable surfaces	240	240	N	■
			O	■
			P	■
			Q	■
			R	■
			S	■
			T	■
			U	■
			V	■
			W	■
[Choose measure]			X	■
[Choose measure]			Y	■
[Choose measure]			Z	■
[Choose measure]			A1	■
[Choose measure]			A2	■
[Choose measure]			A3	■
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[Choose measure]			A35	■

Non Cash Benefits

	What best describes the site?	What's the likelihood of benefit?	Likely Benefit
Pollution of watercourses	Surface water flows into watercourse, inflow is small proportion of watercourse flow, watercourse has some pollution issues	Certain	6
Ecology	SuDS features will lead to small improvement in biodiversity habitats for plants or animals	Unlikely	2
Air pollution	Site in air quality management area, close to populated area or transport corridor and SuDS will include some green infrastructure (e.g. tree planting, green roofs)	Certain	6
Physical activity	SuDS features will significantly enhance areas currently/potentially used for recreation, encouraging children to spend more time outdoors or engaged in physical activity	Certain	9
Education	SuDS features will lead to improved awareness and small increase in number of children engaged about SuDS/drainage and their role in the environment	Certain	6
Mental health	SuDS features will be somewhat visible and accessible, potentially leading to small stress reduction or improvements in mood and concentration	Certain	6
Carbon/Energy Costs	SuDS will include some planting (including trees) or some reduction in building energy use	Certain	6
Flood risk - surface water	SuDS will not reduce area or number of buildings, car parks or recreational spaces at risk of surface water flooding	Certain	3
Flood risk - watercourses	SuDS will significantly reduce or slow run off into a local watercourse with high risk of flooding downstream.	Possible	6
Avoided/reduced maintenance	Reduced flows in local watercourse where channel capacity is an issue as a result of SuDS will significantly reduce need for channel maintenance (e.g. removing invasive species, clearing obstructions)	Certain	9
Temperature regulation	SuDS features will lead to some shading or cooling of external areas, leading to positive health impacts during heatwaves	Certain	6

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Project partners

This resource was created by CLASP with MWH, as part of the Water Resilient Cities – School SuDS Project.

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